No. 3945

United States
Circuit Court of Appeals
For the Ninth Circuit.

3

DAVID G. LORRAINE,

Appellant,

vs.

FRANCIS M. TOWNSEND, MILON J. TRUMBLE and ALFRED J. GUTZLER, Doing Business Under the Firm Name of TRUMBLE GAS TRAP COMPANY,

Appellees.

BOOK OF EXHIBITS.

Upon Appeal from the United States District Court for the Southern District of California, Southern Division.

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Plaintiff's Exhibit No. 1.

No. 1269134.

THE UNITED STATES OF AMERICA.

To all to Whom These Presents Shall Come:

WHEREAS MILON J. TRUMBLE, of

Los Angeles, California,

has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in

CRUDE-PETROLEUM AND NATURAL-GAS SEPARATORS,

He having assigned one-third of his right, title, and interest in said improvement to Francis M. Townsend and one-third to Alfred J. Gutzler, both of Los Angeles, California, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of Law in such cases made and provided, and

WHEREAS upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the Law.

NOW THEREFORE these letters patent are to grant unto the said Milon J. Trumble, Francis M. Townsend, and Alfred J. Gutzler, their heirs or assigns for the term of seventeen years from the eleventh day of June, one thousand nine hundred and eighteen, the exclusive right to make, use and

vend the said invention throughout the United States and the territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this eleventh day of June, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-second.

[Seal] F. W. H. CLAY,
Acting Commissioner of Patents.

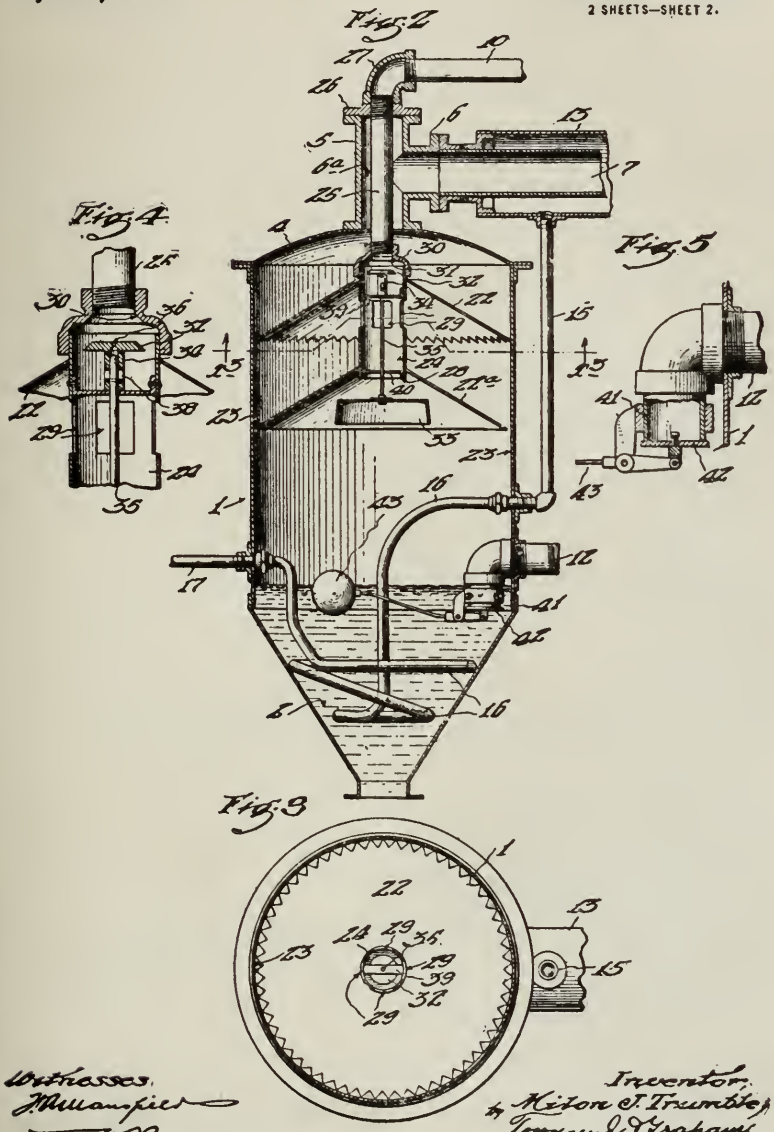
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 2.



Witnesses,
J. Williamson
Ford W. Laue

Inventor,
by Milton J. Trumble,
Townsend & Graham
his Attys

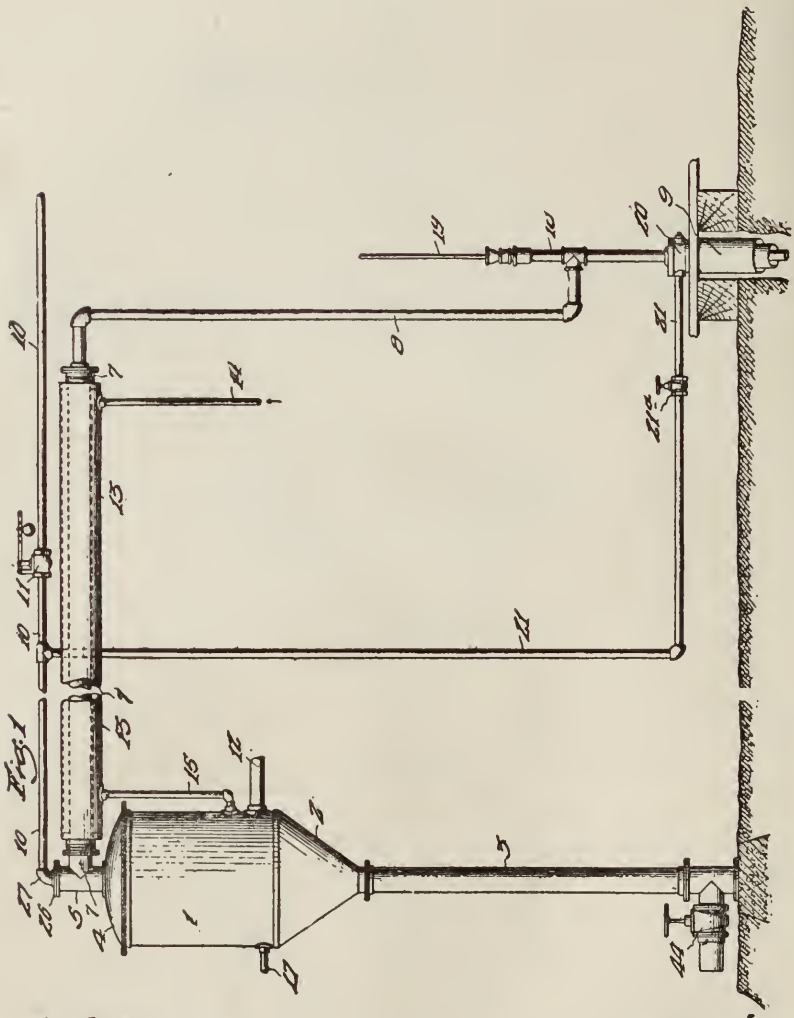
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914.

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 1.



Witnesses
J. Mansfield
Ford W. Harris

Inventor,
Milton J. Trumble,
Townsend & Graham
his attys.

UNITED STATES PATENT OFFICE.

MILON J. TRUMBLE, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO FRANCIS M. TOWNSEND AND ONE-THIRD TO ALFRED J. GUTZLER, BOTH OF LOS ANGELES, CALIFORNIA.

CRUDE-PETROLEUM AND NATURAL-GAS SEPARATOR.

1,269,134. Specification of Letters Patent. Patented June 11, 1918.

Application filed November 14, 1914. Serial No. 872,110.

To all whom it may concern:

Be it known that I, MILON J. TRUMBLE, citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Crude-Petroleum and Natural-Gas Separator, of which the following is a specification.

My invention is designed to effect a separation of natural gas from the crude oil when the same is first delivered from the well, and is also designed to accomplish the cleaning of the oil from free water and sand at the same time.

My invention is also adapted to overcome the unseating of the pump valve in an oil well when an excess of natural gas is present with the oil, thereby materially increasing the amount of oil produced from wells where high pressure of gas exists.

My invention is also adapted to reduce the velocity and equalize the delivery of oil from wells in which the pressure of gas causes the oil to flow in gushes or by heads.

My invention is also effective in maintaining the lighter gravity series of the crude oil in combination with the heavier series of the oil, thereby producing from oil wells a product of lighter gravity than where the oil and gas is permitted to separate on exposure to ordinary atmospheric conditions.

My invention consists in the arrangement and combinations of parts as hereinafter set forth.

The accompanying drawings illustrate my invention and one method of its application:

Figure 1 is an elevation showing my invention as applied to an oil well, the velocity reducing means and gas line being broken to contract the view.

Fig. 2 is a vertical section of the expansion chamber and fragment of velocity reducing means and oil heating means.

Fig. 3 is an inverted section of the expansion chamber taken on the line x^3—x^3 Fig. 3.

Fig. 4 is an enlarged vertical section of oil stopper for gas line.

Fig. 5 is an enlarged view of the oil outlet, the lower end of the outlet pipe and closure therefor being shown in section.

As shown in the drawings the expansion chamber 1 is provided with a tapering settling chamber 2 which in turn communicates with and is supported by a stand pipe 3. The top 4 of the chamber is centrally perforated and a T 5, having its stem 6 disposed horizontally, is arranged to register with the central perforation in the top 4. Velocity reducing means, such as pipe 7, communicates with the horizontal stem 6 of the T 5 and delivers oil and gas into the interior of the chamber 1 through the vertical member 6^a of the T. The velocity reducing means 7, as shown, consists of a pipe many times greater in area than the oil pipe 8 which delivers the oil from the well 9.

A gas pipe 10 is arranged to lead the gas from the upper end of the T 5, and connects with the gas collector within the expansion chamber, which will hereafter be explained. A gas pressure regulating valve 11 is provided in gas pipe 10 and controls the passage of gas from the expansion chamber to any suitable receiver or destination.

Oil outlet means 12 is provided from the chamber at a point intermediate the settling chamber of the expansion chamber and the oil inlet means. When the character of the oil demands, oil heating means may be provided such as the steam jacket 13 which surrounds the velocity reducer 7. A steam pipe 14 is arranged to supply steam to such jacket. When desired a pipe 15 takes steam from the jacket 13 and delivers the same to a coil 16 arranged in the settling chamber 2 to further heat the oil within the chamber. The exhaust from the coil 16 is effected through pipe 17 which passes through the wall of the chamber.

A pump tube 18 having a sucker rod 19 is shown mounted on the casing head 20 of a well 9. A gas pressure pipe 21 is shown as connecting the gas pipe 10 with the casing head of the well to apply the pressure of the gas within the expansion chamber to the top of the oil within the well 9 which surrounds the pump tube 18. A valve 21^a may be provided in the pressure pipe 21 to regulate the pressure within the well, or such valve may be dispensed with, in which event the pressure on the oil surrounding the pump tube and the oil in the oil pipe 8 will be equalized.

Oil dividing means are provided interior

of the expansion chamber, such as cones 22 and 22ª. Preferably these dividing cones are spaced apart, one below the other, as shown, with their peripheries nearly in contact with the wall of the chamber. The oil is delivered onto the upper surface of the cone 22 and spreads over the same evenly and is brought into contact with the wall 23 of the chamber and flows downwardly thereover until it is collected in the settling chamber. The cone 22ª is provided as a supplemental spreader to insure the even distribution of the oil over the wall of the chamber. As shown in the form herein illustrated, the cones 22 and 22ª are supported in the upper portion of the expansion chamber by means of gas collecting chamber 24 and pipe 25. Pipe 25 is screwed into flange 26 which in turn is seated upon and closes the upper end of the vertical member 6ª of the T 5, to which is connected the elbow 27 of the gas pipe 10. The lower end of the pipe 25 is screwed into a reducer 30, arranged with its larger end looking downward to receive the upper end of the gas collecting chamber 24 which is open at its lower end 28. The gas collecting chamber is also provided with gas admitting ports 29, 29 and 29 arranged between the cones 22 and 22ª which are protected thereby to prevent the entrance of oil into the gas line.

A valve seat 31 is provided in the reducer 30, and a valve stopper 32 is provided with means for seating the same when oil may rise within the chamber to a point where it may gain access to the gas line 10. As shown, this stopper 32 comprises a flat circular body having a beveled edge adapted to fit the valve seat in the reducer, and is provided with a perforated shank 34 through which the float rod 35, actuated by float 33, passes to open and close a vacuum breaker opening 36 in the stopper before actuating the stopper 32. A slot 38 is provided in the shank 34 which permits of the passage of a pin therethrough and through the float rod to limit the movement of such rod in breaking the vacuum to permit the unseating of the stopper.

The movement of the stopper, float rod, and float, away from the valve seat is limited by the end of shank 34 coming into contact with a bracket 39. A bracket 40 is arranged near the bottom of the gas collecting chamber to guide the float rod 35.

A trapped oil outlet from the chamber is provided which consists of a submerged pipe 41 provided with a closure 42 which is actuated by means of a float 43 which is so adjusted as to cause the pipe to be closed to the exit of oil before the level of oil reaches the open end of the pipe, to thereby prevent the escape of gas along with the outflowing oil from the chamber. Other forms of traps will readily suggest themselves, but the form herewith disclosed illustrates the function desired to be derived. A valve 44 is provided to permit sand and water to be drawn from stand pipe and settling chamber when desired.

It is to be remembered that an important feature of my invention is to provide means whereby the oil is divided into a thin or broken body whereby the gas may readily escape from its engagement therewith and it is also desirable to maintain the oil in its divided form for a period of time sufficient for all the gas to free itself from the oil. It is also desirable to maintain the oil in a quiescent condition for a short period of time within the settling chamber to permit sand and water to settle out of the same before the oil is drawn from the chamber.

In practice, oil is pumped from the well by actuating the sucker rod 19, which forces the oil through the pipe 8 to the velocity reducer 7 from which it flows through the T 5 onto the top of the cone 22 by which it is spread over the wall of the expansion chamber and envelops the gas collector. The oil may be heated while passing through the velocity reducer by means of the steam jacket 13 up to or about the boiling point of water. This heating will result in weakening the surface tension upon any water contained in the oil and allows the same to settle in the bottom of the chamber. The settling of the water may be materially assisted by the pressure of the gas within the chamber, and, if necessary, more heat may be applied to the oil by means of the steam coil 16.

In case oil is being taken from a well of the flowing type, and is intermittent in its heads, the velocity reducer will afford means for equalizing the flow of oil into the expansion chamber. In case a large amount of oil should be delivered to the expansion chamber, and the egress thereof should be slower than the amount coming in, the float 33 will actuate the stopper 32 and close the gas outlet to prevent oil from getting into the gas line. The gas pressure will then increase and thereby force the oil from the chamber until the float will drop down to open the gas line again. The pressure regulating valve 11 in the gas line 10 controls the exit of gas from the expansion chamber and thereby keeps a constant pressure on the oil within the chamber.

In the case of a wet gas, or a gas saturated with an oil of the lighter series, such as gasolene, it is desirable to maintain as high a pressure within the expansion chamber as may be practicable for the reason that a large amount of such light series will thereby be compressed and remain with the oil. In some instances this action has resulted in producing an oil three points higher in gravity, according to the Baumé

scale, than had been produced by subjecting the oil and gas to the atmospheric action to permit the gas to escape. This increase in lightness of gravity brought the producer an increase of price amounting to fifteen cents per barrel.

The admission of gas under pressure to the casing head of a well to equalize the pressure of gas within the pump tube, prevents the oil from slipping in the pump barrel on account of the valve being unseated by the upwardly flowing gas. This action is produced by my invention increases the pumping efficiency and the production of the well, thereby making profitable producers of wells that have theretofore been unprofitable.

The oil flowing from the expansion chamber through outlet 12 may be conducted to any suitable tank or receptacle either by the pressure of the gas within the chamber or by gravity.

When desired, a safety valve may be provided for the chamber 1 to permit escape of gas from the expansion chamber in the event that valve 32 should become stuck or remain seated on its seat. In some cases the float 33 and valve 32 may be dispensed with.

It will be noted that the action upon the oil while flowing down the wall of the expansion chamber in a thin film under pressure permits the free, dry, gas to readily escape therefrom, while the pressure exerted upon the oil surface backed by the wall of the chamber holds the lighter liquids, such as gasolene, in combination with the oil body, and I desire to be understood as pointing out and claiming this action as being of great benefit to the crude oil derived from the well on account of keeping the gasolene series in combinaton with the main body of oil.

I claim as my invention:

1. In an oil and gas separator, the combination of an expansion chamber arranged to receive oil and gas in its upper portion, means for spreading the oil over the wall of such chamber to flow downwardly thereover, gas take-off means arranged to take off gas from within the flowing film of oil, an oil collecting chamber below the expansion chamber, an oil outlet from said collecting chamber, and valve controlled means arranged to maintain a submergence of the oil outlet.

2. In an oil and gas separator, the combination of an expansion chamber, inlet means arranged to permit the entrance of oil and gas into the chamber, means within the chamber adapted and arranged to distribute the oil over the wall of the chamber in a downwardly flowing film, gas take-off means arranged to take gas from within the envelop of downwardly flowing oil, and means for maintaining gas pressure upon such oil.

3. In an oil and gas separator, the combination of an expansion chamber having a surface adapted to sustain a flow of oil thereover in a thin body, means for distributing oil onto such surface, pressure maintaining means arranged and adapted to maintain a pressure on one side of the flowing oil, withdrawing means arranged to take gas from the chamber, and means for withdrawing oil from the chamber.

4. In an oil and gas separator, the combination of an expansion chamber, means for delivering oil and gas into the chamber, means for maintaining pressure within the chamber, means for drawing oil from the chamber, and means within the chamber adapted to cause the oil to flow in a thin body for a distance to enable the gas contained and carried thereby to be given off while the oil is subjected to pressure.

5. The combination in an oil and gas separator of an expansion chamber having a settling chamber communicating therewith, means for delivering oil and gas into the upper portion of the expansion chamber, a cone arranged near the top of such chamber to receive the incoming oil and spread it over the wall of the chamber in a thin film like form, a gas collector arranged below the cone, gas outlet means from such collector, a float controlled valve arranged to close the gas outlet means, means for drawing oil from the separator above the settling chamber, and means for discharging sand or water from said settling chamber.

6. The combination in an oil and gas separator of an expansion chamber having a settling chamber communicating therewith, means for delivering oil and gas to the chamber, oil spreading and dividing means arranged to receive the oil within the chamber and spread it in a thin film like form over the wall of the chamber to flow theredown, gas collecting and outlet means arranged below the oil spreading means and within the flowing film of oil, a float controlled valve arranged to close the gas outlet when the oil rises to a predetermined height within the expansion chamber, a float controlled valved outlet from the separator whereby a predetermined depth of oil is maintained in the settling chamber to submerge the oil outlet and prevent the passage of gas therethrough and means for discharging sand or water from the settling chamber.

7. In a gas and oil separator, the combination of an expansion chamber, oil spreading means arranged within the chamber, oil supplying means arranged to deliver oil into such expansion chamber and onto the spreader means, gas collecting means arranged within the chamber, gas outlet means communicating with the gas

collecting means, oil outlet means from the expansion chamber arranged to draw oil from a point above the bottom thereof, such oil supplying means comprising an oil pipe from a suitable oil supply and a velocity reducing means connected therewith, whereby the oil and gas are delivered to the expansion chamber in quiescent condition.

8. In an oil and gas separator, the combination of an expansion chamber, means within the chamber adapted to spread the oil in a thin film like form over the wall of the chamber, gas outlet means leading from the chamber, consisting of a gas pipe, pressure regulating means arranged to control the passage of gas from the chamber through such gas pipe, oil outlet means arranged to draw oil from the expanding chamber, means to maintain such oil outlet means submerged within the body of oil in the chamber, velocity reducing means arranged to receive oil and gas from a source of oil supply and deliver the same into the expansion chamber, and means for heating the oil within the velocity reducing device before its entry into the expansion chamber.

9. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the T and into the expansion chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

10. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the T and into the expansion chamber, means for delivering oil to the chamber through the stem of the T, means for heating the oil during its passage to such chamber, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

11. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, means for regulating the flow of gas from such expansion chamber through such gas pipe to maintain pressure within such chamber, a gas pipe depending from such bushing through the cross of the T and into the expanding chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

12. In an oil and gas separator, the combination of an expansion chamber, a settling chamber communicating therewith adapted to receive the oil and retain the same in a quiet condition for a period of time, a stand pipe arranged to support the expansion chamber and settling chamber and to receive sand and water from the settling chamber, a submerged and trapped outlet for the oil arranged to draw oil from the separator, means for introducing oil into the expansion chamber, means adapted to divide the oil within the chamber, a gas outlet from the chamber, and means for preventing oil entering such gas outlet.

13. In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and means for taking gas from the central portion of said chamber.

14. In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and a gas outlet pipe supporting said cone and passing vertically upward through said inlet means, said pipe being arranged to take off gas from the apex of said cone.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 9th day of November, 1914.

MILON J. TRUMBLE.

In presence of—
F. M. Townsend,
A. J. Gutzler.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

[Endorsed]: E—113. Townsend et al. vs. Lorraine. Plffs. Exhibit 1. Filed March 22, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Plaintiff's Exhibit No. 2.

2—390.

UNITED STATES OF AMERICA,

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the File Wrapper, Contents and Drawings, in the matter of the

Letters Patent of

Milon J. Trumble, Assignor of One-third to Francis M. Townsend and One-third to Alfred J. Gutzler,

Number 1,269,134, Granted June 11, 1918,

for

Improvement in Crude Petroleum and Natural Gas Separator.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent

Office to be affixed in the District of Columbia this 5th day of March, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] M. H. COULSTON,
Commissioner of Patents.

2—437

DIV. ~~31~~ 25
NUMBER (SERIES OF 1900).

872110 , 1914 37 - 7

(EX'R'S BOOK.) ~~1161~~ 260

, 191 PATENT No. 1269134

Name Milon J. Trumble,
Assor of 1/3 to Francis M. Townsend and 1/3 to Alfred J. Gutzler,
both of Los Angeles Cal.

of Los Angeles,

County of

, filed State of California

Invention Crude Petroleum and Natural Gas Separator.

Division of App., No.

PARTS OF APPLICATION FILED.	ORIGINAL.		RENEWED.	
Petition	Nov. 14	, 1914		, 191
Affidavit	" "	, 1914		, 191
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Appl. filed complete	Nov 14	, 1914		, 191

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J H. Lightfoot Exr. Div. 25 Exr. Div. , 191

Notice of Allowance Jan. 18 , 1918 , 191
By Commissioner. By Commissioner.

Final Fee ~~Cash~~ Cert dated May 8 , 1918 , 191

" " Cert. $20 May 13 , 1918 , 191

Patented JUN 11 1918 , 191

Attorney ~~Townsend & Graham, Higgins Bld'g, Los Angeles, Calif,~~ a sub ~~Associate~~ Attorney Graham and Harris
#933 Higgins B'ld'g. Los Angeles, Cal

(No. of Claims Allowed 14) Title as Allowed Crude Petroleum and Natural Gas Separator
Cl. 183 - 105)

Natural Gas Separator

O.G. Claims 4,8 and 11

872110

LETTER-HEAD.

15 Received 872,110
Nov.
14
1914. M. C. G. November 9, 1914.

Chief Clerk U. S. Patent Office.

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:

Enclosed herewith find application papers of Milon J. Trumble, for United States Letters Patent on CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

We enclose herewith Post Office Money Order, No. 324,757, dated November 9, 1914, for $15.00, which amount please apply as the filing fee for this application.

Kindly file, acknowledge receipt, and oblige.

Very respectfully,
TOWNSEND & GRAHAM.

C.
Encs.

Mail Room 872,110
Nov.
14,
1914 4605

U. S. Patent Office.

PETITION AND POWER OF ATTORNEY.

To the Hon. Commissioner of Patents:

Your petitioner, Milon J. Trumble, a citizen of

the United States, residing at Los Angeles, in the County of Los Angeles, and State of California, whose Post Office address is 1918 Santee Street, Los Angeles, Los Angeles County, California, prays that Letters Patent may be granted to him for the CRUDE PETROLEUM AND NATURAL GAS SEPARATOR, set forth in the annexed specification, and he hereby appoints the firm of

TOWNSEND & GRAHAM,

(the individual members of which firm are Francis M. Townsend and Frank L. A. Graham), of 1029 Higgins Building, Los Angeles, California, his attorneys, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent and to transact all business in the Patent Office connected therewith.

MILON J. TRUMBLE.

SPECIFICATION. 4606

To All Whom It May Concern:

Be it known that I, MILON J. TRUMBLE, a citizen of the United States, residing at Los Angeles, in the County of Los Angeles, and State of California, have invented a new and useful CRUDE-PETROLEUM AND NATURAL GAS SEPARATOR, of which the following is a specification:–

My invention is designed to effect a separation of natural gas from the crude oil when the same is first delivered from the well, and is also designed

to accomplish the cleaning of the oil from free water and sand at the same time.

My invention is also adapted to overcome the unseating of the pump valve in an oil well when an excess of natural gas is present with the oil, thereby materially increasing the amount of oil produced from wells where high pressure of gas exists.

My invention is also adapted to reduce the velocity and equalize the delivery of oil from wells in which the pressure of gas causes the oil to flow in gushes or by heads.

My invention is also effective in maintaining the lighter gravity series of the crude oil in combination with the heavier series of the oil, thereby producing from oil wells a product of lighter gravity than where the oil and gas is permitted to separate on exposure to ordinary atmospheric conditions.

My invention consists in the arrangement and combinations of parts as hereinafter set forth.

4607

The accompanying drawings illustrate my invention and one method of its application:

Fig. 1 is an elevation showing my invention as applied to an oil well, the velocity reducing means and gas line being broken to contract the view.

sion

per A

Fig. 2 is a vertical section of the expan~~ding~~ chamber and fragment of velocity reducing means and oil heating means.

Fig. 3 is an inverted section of the expan~~ding~~sion chamber taken on line x3-x3 Fig. 3. per A

Fig. 4 is an enlarged vertical section of oil stopper for gas line.

Fig. 5 is an enlarged view of the oil outlet, the lower end of the outlet pipe and closure therefor being shown in section. " A

As shown in the drawings, the expan~~ding~~sion chamber 1 is provided with a tapering settling chamber 2 which in turn communicates with and is supported by a stand pipe 3. The top 4 of the chamber is centrally perforated and a T 5, having its stem 6 disposed horizontally, is arranged to register with the central perforation in the top 4. Velocity reducing means, such as pipe 7, communicates with the horizontal stem 6 of the T 5 and delivers oil and gas into the interior of the chamber 1 through the vertical member 6^a of the T. The velocity reducing means 7, as shown, consists of a pipe many times greater in area than the oil pipe 8 which delivers the oil from the well 9. " A

A gas pipe 10 is arranged to lead the gas from the upper end of the T 5, and connects with the gas collector within the expan~~ding~~sion chamber, which will hereafter be explained. A gas pressure regulating valve 11 is provided in gas pipe 10 and controls the passage of gas from the expan~~ding~~sion chamber to any suitable receiver or destination. Oil out- " A

let means 12 is provided from the chamber at a point intermediate the settling chamber of the

per A expan~~ding~~sion chamber and the oil inlet means. When the character of the oil demands, oil heating means may be provided such as the steam jacket 13 which surrounds the velocity reducer 7. A steam pipe 14 is arranged to supply steam to such jacket. When desired a pipe 15 takes steam from the jacket 13 and delivers the same to a coil 16 arranged in the settling chamber 2 to further heat the oil within the chamber. The exhaust from the coil 16 is effected through pipe 17 which passes through the wall of the chamber.

A pump tube 18 having a sucker rod 19 is shown mounted on the casing head 20 of a well 9. A gas pressure pipe 21 is shown as connecting the gas pipe 10 with the casing head of the well to apply

" A the pressure of the gas within the expan~~ding~~sion chamber to the top of the oil within the well 9 which surrounds the pump tube 18. A valve 21[a] may be provided in the pressure pipe 21 to regulate the pressure within the well, or such valve may be dispensed with, in which event the pressure on the oil surrounding the pump tube and the oil in the oil pipe 8 will be equalized.

4609

Oil dividing means are provided interior of the

" A expan~~ding~~sion chamber, such as cones 22 and 22[a]. Preferably these dividing cones are spaced apart, one below the other, as shown, with their peri-

pheries nearly in contact with the wall of the chamber. The oil is delivered on to the upper surface of the cone 22 and spreads over the same evenly and is brought into contact with the wall 23 of the chamber and flows downwardly thereover until it is collected in the settling chamber. The cone 22[a] is provided as a supplemental spreader to insure the even distribution of the oil over the wall of the chamber. As shown in the form herein illustrated, the cones 22 and 22[a] are supported in

per A the upper portion of the expan~~ding~~sion chamber by means of gas collecting chamber 24 and pipe 25. Pipe 25 is screwed into flange 26 which in turn is seated upon and closes the upper end of the vertical member 6[a] of the T 5, to which is connected the elbow 27 of the gas pipe 10. The lower end of the pipe 25 is screwed into a reducer 30, arranged with its larger end looking downward to receive the upper end of the gas collecting chamber 24 which is open at its lower end 28. The gas collecting chamber is also provided with gas admitting ports 29, 29 and 29 arranged between the cones 22 and 22[a] which are protected thereby to prevent the entrance of oil into the gas line.

A valve seat 31 is provided in the reducer 30, and a valve stopper 32 is provided with means for seating the same when oil may rise within the chamber to a point where it may gain access to the gas line 10. As shown, this stopper 32 comprises a flat

4610

circular body having a beveled edge adapted to fit

the valve seat in the reducer, and is provided with a perforated shank 34 through which the float rod 35, actuated by float 33, passes to open and close a vacuum breaker opening 36 in the stopper before actuating the stopper 32. A slot 38 is provided in the shank 34 which permits of the passage of a pin therethrough and through the float rod to limit the movement of such rod in breaking the vacuum to permit the inseating of the stopper.

The movement of the stopper, float rod, and float, away from the valve seat is limited by the end of shank 34 coming into contact with a bracket 39. A bracket 40 is arranged near the bottom of the gas collecting chamber to guide the float rod 35.

A trapped oil outlet from the chamber is provided which consists of a submerged pipe 41 provided with a closure 42 which is actuated by means of a float 43 which is so adjusted as to cause the pipe to be closed to the exit of oil before the level of oil reaches the open end of the pipe, to thereby prevent the escape of gas along with the out flowing oil from the chamber. Other forms of traps will readily suggest themselves, but the form herewith disclosed illustrates the function desired to be derived. A valve 44 is provided to permit sand and water to be drawn from stand pipe and settling chamber when desired.

It is to be remembered that an important feature of my invention is to provide means whereby the oil is divided into a thin or broken body whereby the

4611

gas may readily escape from its engagement there-

with and it is also desirable to maintain the oil in its divided form for a period of time sufficient for all the gas to free itself from the oil. It is also desirable to maintain the oil in a quiescent condition for a short period of time within the settling chamber to permit sand and water to settle out of the same before the oil is drawn from the chamber.

In practice, oil is pumped from the well by actuating the sucker rod 19, which forces the oil through the pipe 8 to a velocity reducer 7 from which it flows through the T 5 on to the top of the cone 22 by which it is spread over the wall of the expan~~ding~~sion chamber and envelops the gas collector. The oil may be heated while passing through the velocity reducer by means of the steam jacket 13 up to or about the boiling point of water. This heating will result in weakening the surface tension upon any water contained in the oil and allows the same to settle in the bottom of the chamber. The settling of the water may be materially assisted by the pressure of the gas within the chamber, and, if necessary, more heat may be applied to the oil by means of the steam coil 16. per A

In case oil is being taken from a well of the flowing type, and is intermittent in its heads, the velocity reducer will afford means for equalizing the flow of oil into the expan~~ding~~sion chamber. In case a large amount of oil should be delivered to the expan~~ding~~sion chamber, and the egress thereof should be " A " A

4612

slower than the amount coming in, the float 33 will actuate the stopper 32 and close the gas outlet to prevent oil from getting into the gas line. The gas pressure will then increase and thereby force the oil from the chamber until the float will drop down to open the gas line again. The pressure regulating valve 11 in the gas line 10 controls the exit of gas

per A from the expan~~ding~~sion chamber and thereby keeps a constant pressure on the oil within the chamber.

In the case of a wet gas, or a gas saturated with an oil of the lighter series, such as gasoline, it is desirable to maintain as high a pressure within the

" A expan~~ding~~sion chamber as may be practicable for the reason that a large amount of such light series will thereby be compressed and remain with the oil. In some instances this action has resulted in producing an oil three points higher in gravity, according to the Baume scale, than had been produced by subjecting the oil and gas to the atmospheric action to permit the gas to escape. This increase in lightness of gravity brought the producer an increase of price amounting to fifteen cents per barrel.

The admission of gas under pressure to the casing head of a well to equalize the pressure of gas within the pump tube, prevents the oil from slipping in the pump barrel on account of the valve being unseated by the upwardly flowing gas. This action as produced by my invention increases the pumping efficiency and the production of the well, thereby

making profitable producers of wells than have heretofore been unprofitable.

4613

per A

The oil flowing from the expan~~ding~~sion chamber through outlet 12 may be conducted to any suitable tank or receptacle either by the pressure of the gas within the chamber or by gravity.

When desired, a safety valve may be provided for the chamber 1 to permit escape of gas from the

" 'A

expan~~ding~~sion chamber in the event that valve 32 should become stuck or remain seated on its seat. In some cases the float 33 and valve 32 may be dispensed with.

Insert A'

I claim as my invention:- 4614

1. The combination in an oil and gas separator, of an expanding chamber having a settling bottom, means for delivering oil and gas to the upper portion of the chamber, means for reducing the oil into a finally divided condition to reduce the tension on the gas contained therein, gas outlet means from the chamber and an oil outlet from the chamber intermediate the settling bottom of the chamber and the gas outlet.

2. The combination in an oil and gas separator of an expanding chamber, a settling chamber communicating therewith, oil dividing means arranged in the expanding chamber to reduce the oil to a thin film like condition, means for delivering the oil to be freed from gas to the dividing means, a gas outlet from the chamber and a trapped oil outlet arranged to draw oil from the separator intermediate the settling chamber and the oil dividing means.

3. The combination in an oil and gas separator of an expanding chamber, a settling chamber communicating therewith arranged to receive the oil after being freed from gas, gas freeing means consisting of means to reduce the oil to a thin film arranged within the expanding chamber, a gas collector arranged within the oil dividing means, a gas outlet arranged to communicate
Sub A^2 with the gas collector, and a trapped oil outlet arranged to draw oil from the separator at a point intermediate the settling chamber and the gas outlet.

5 ~~4~~. The combination in an oil and gas separator

of an expan~~ding~~sion chamber having a settling chamber per A
communicating therewith, means for delivering oil
and gas into the upper portion of the expan~~ding~~sion
chamber, a cone arranged near the top of such
chamber to receive the incoming oil and spread it
over the wall of the chamber in a thin film like form,
a gas collector arranged below the cone, gas outlet
means from such collector, a float controlled valve
arranged to close the gas outlet means, ~~and~~ means
for drawing oil from the separator above the set- " A
tling chamber, and means for discharging sand or " A
water from said settling chamber.

6. ~~5~~. The combination in an oil and gas sepa-
rator of an expan~~ding~~sion chamber having a settling " A
chamber communicating therewith, means for de-
livering oil and gas to the chamber, oil spreading
and dividing means arranged to receive the oil
within the chamber and spread it in a thin film like
form over the walls of the chamber to flow there-
down, gas collecting and outlet means arranged be-
low the oil spreading means and within the flowing
film of oil, a float controlled valve arranged to close
the gas outlet when the oil rises to a predetermined
height within the expan~~ding~~sion chamber, ~~and~~ a float " A
controlled valve outlet from the separator whereby
a predetermined depth of oil is maintained in the
settling chamber to submerge the oil outlet and
prevent the passage of gas therethrough, and means " A

for discharging sand or water from the settling chamber.

7. ~~6~~. In a gas and oil separator, the combination

per A of an expan~~ding~~sion chamber, oil spreading means arranged within the chamber, oil supplying means ar-

" A ranged to deliver oil into such expan~~ding~~sion chamber and on to the spreader means, gas collecting means

4616

arranged within the chamber, gas outlet means communicating with the gas collecting means, oil out-

" A let means from the expan~~ding~~sion chamber arranged to draw oil from a point above the bottom thereof, such oil supplying means comprising an oil pipe from a suitable oil supply and a velocity reducing means connected therewith, whereby the oil and

" A gas are delivered to the expan~~ding~~sion chamber in quiescent condition.

8. ~~7~~. In an oil and gas separator, the combina-

" A tion of an expan~~ding~~sion chamber, means within the chamber adapted to spread the oil in a thin film like form over the wall of the chamber, gas outlet means leading from the chamber, consisting of a gas pipe, pressure regulating means arranged to control the passage of gas from the chamber through such gas pipe, oil outlet means arranged to draw oil from the expanding chamber, means to maintain such oil outlet means submerged within the body of oil in the chamber, velocity reducing means arranged to re-

ceive oil and gas from a source of oil supply and deliver the same into the expan~~ding~~sion chamber, and means for heating the oil within the velocity reducing device before its entry into the expan~~ding~~sion chamber.

~~9. 8.~~ In an oil and gas separator, the combination of an expan~~ding~~sion chamber, means within the chamber to divide the oil to reduce the surface tension of the oil upon the gas contained therein, an oil outlet from the bottom of the chamber, an oil inlet through the top of such chamber arranged to deliver oil on to the top of the oil dividing means, and gas outlet means comprising a pipe passing upwardly through the oil inlet supporting the oil dividing means within the expan~~ding~~sion chamber.

4617

9. ~~10~~. ~~9~~. In an oil and gas separator, the combination of an expan~~ding~~sion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the T and into the expan~~ding~~sion chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end

of the last named gas pipe, and means for drawing oil from the chamber.

10. ~~11~~. ~~10~~. In an oil and gas separator, the com-

per A bination of an expan~~ding~~sion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the

" A T and into the expan~~ding~~sion chamber, means for delivering oil to the chamber through the stem of the T, means for heating the oil during its passage to such chamber, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

11. ~~12~~. ~~11~~. In an oil and gas separator, the com-

" A bination of an expan~~ding~~sion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, means

" A

" A for regulating the flow of gas from such expan~~ding~~sion chamber through such gas pipe to maintain pressure within such chamber, a gas pipe depending from such bushing through the cross of the T and into

the expanding chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

12. ~~13~~. ~~12~~. In an oil and gas separator, the combination of an expan~~ding~~sion chamber, a settling chamber communicating therewith adapted to receive the oil and retain the same in a quiet condition for a period of time, a stand pipe arranged to support the expan~~ding~~sion chamber and settling chamber and to receive sand and water from the settling chamber, a submerged and trapped outlet for the oil arranged to draw oil from the separator, means for introducing oil into the expan~~ding~~sion chamber, means adapted to divide the oil within the chamber, a gas outlet froh the chamber, and means for preventing oil entering such gas outlet.

per A

" A

" A

Insert B′

4619

IN TESTIMONY WHEREOF, I have hereunto set my hand at Los Angeles, California, this 9th day of November, 1914.

MILON J. TRUMBLE.

In presence of:

F. M. TOWNSEND.
A. J. GUTZLER.

OATH.

State of California,
County of Los Angeles,—ss.

Milon J. Trumble, the above-named petitioner, being duly sworn, deposes and says that he verily believes himself to be the original, first and sole inventor or discoverer of the CRUDE PETROLEUM AND NATURAL GAS SEPARATOR described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof; or patented or described in any printed publication in any country before his invention or discovery thereof, or more than two years prior to this application; or in public use or on sale in the United States for more than two years prior to this application, and that no application for patent on said invention has been filed by him or his legal representatives or assigns in any foreign country.

And said MILTON J. TRUMBLE states that he is a citizen of the United States, and resident of

Los Angeles, in the County of Los Angeles, and State of California.

MILON J. TRUMBLE.

Subscribed and sworn to before me this 9th day of November, 1914.

[Seal] FRED A. MANSFIELD,
Notary Public in and for the County of Los Angeles, State of California.

Div. 31, Room 169. Paper No. 2.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON.

Dec. 2, 1914.
U. S. PATENT OFFICE.
Dec. 4, 1914.
MAILED.

Townsend and Graham,
Higgins Building,
Los Angeles, Cal.

Please find below a communication from the EXAMINER in charge of the application of Milon J. Trumble, filed Nov. 14, 1914, Se. No. 872,110. Crode Petroleum and Natural Gas Separator.

THOMAS EWING,
Commissioner of Patents.

This application has been taken up for examination.

On page 2, line 14, after the word "of" insert the word *the*.

Throughout the description of the specification and the claims the ..rd expansion should be substituted for the word "expanding." The vessel or chamber, *per se,* does not expand.

Claims 1, 2, 3 are each rejected on patents 927,476, Barker, July 13, 1909, and 1,014,943, Bray, Jan. 16, 1912 (48—142).

Claim 4, is rejected on the patent above to Bray.

Claim 5 in addition to the patents above is rejected on patents 428,399, Moore, May 20, 1890, and 611,314, Cullinan, Sep. 27, 1898 (48—142).

Claim 8 is rejected on the patent above to Bray and the patent 426,880, Taylor, April 29, 1890. (48—142.)

ELY,
Examiner. Div. 31.

STOKES.

4620
SERIAL No. 872,110.

U. S. PATENT OFFICE,
RECEIVED
MAR. 15, 1915.

A

DIVISION 31, PAPER No. 3.

Mail Room,
Mar.
15,
1915.
U. S. Patent Office.
Div. 31,
Room 169,
Milon J. Trumble,

Crude Petroleum and Natural Gas Separator,
Filed Nov. 14, 1914,
Serial No. 872,110.

Los Angeles, Calif., Mar. 10, 1915.

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:

Examiner's letter of December 2d, 1914, together with the United States patents cited therein, has been carefully considered, and in response thereto we amend as follows:

Page 2, line 14, after the word "of" insert—the—

Chance the word "expanding" to be "expansion" in the following places— In lines 6, 9, and 16 of page 2. Lines 3, 6, 10 and 25 of page 3. Line 2 and 14 of page 4. Lines 14, 28 and 29 of page 6. Lines 7 and 13 of page 7. Lines 1 and 6 of page 8.

At the close of the specification, page 8, insert the following

---

—It will be noted that the action upon the oil while flowing down the wall of the expansion chamber in a thin film under pressure permits the free, dry, gas to readily escape therefrom, while the pres-

A′ Cls. 1–4.

4621

Ser. No. 872,110.

sure exerted upon the oil surface backed by the wall of the chamber holds the lighter liquids, such as gasoline, in combination with the oil body, and I desire to be understood as pointing out and claim-

ing this action as being of great benefit to the crude oil derived from the well on account of keeping the gasoline series in combination with the main body of oil.

Cancel claims 1, 2 and 3, and insert the following:

---

1. In an oil and gas separator, the combination of an expansion chamber arranged to receive oil and gas in its upper portion, means for spreading the oil over the wall of such chamber to flow downwardly there over, gas take-off means arranged to take off gas from within the flowing film of oil, an oil collecting chamber below the expansion chamber, an oil outlet from said collecting chamber, and valve controlled means arranged to maintain a submergence of the oil outlet.

2. In an oil and gas separator, the combination of an expansion chamber, inlet means arranged to permit the entrance of oil and gas into the chamber, means within the chamber adapted and arranged to distribute the oil over the wall of the chamber in a downwardly flowing film, gas take-off means arranged to take gas from within the envelope of downwardly flowing oil, and means for maintaining gas pressure upon such oil.

4622

3. In an oil and gas separator, the combination of an expansion chamber having a surface adapted to sustain a flow of oil thereover in a thin body, means for distributing oil on to such surface, pressure maintaining means arranged and adapted to maintain a pressure on one side of the flowing oil,

withdrawing means arranged to take gas from the chamber, and means for withdrawing oil from the chamber.

4. In an oil and gas separator, the combination of an expansion chamber, means for delivering oil and gas into the chamber, means for maintaining pressure within the chamber, means for drawing oil from the chamber, and means within the chamber adapted to cause the oil to flow in a thin body for a distance to enable the gas contained and carried thereby to be given off while the oil is subjected to pressure.

Renumber claims 4, 5, 6, 7, 8, 9, 10, 11 and 12, as 5, 6, 7, 8, 9, 10, 11, 12 and 13, respectively.

We amend renumbered claim 5 as follows:

Line 2 of said claim, change "expanding" to—expansion—; same claim, line 10, cancel "and"—; last line, before the period, insert—above the settling chamber, and means for discharging sand or water from said setting chamber—.

4623

In renumbered claim 6, lines 2 and 11, change "expanding" to —expansion—; line 11, cancel "and"—; last line, before the period, insert—and means for discharging sand or water from the settling chamber—.

Renumbered claim 7, lines 2, 4, 7 and 12, change "expanding" to —expansion—.

Renumbered claim 8, lines 2, 12 and 14, change "expanding" to —expansion—.

Renumbered claim 9, lines 2 and 9, change "expanding" to expansion—.

Renumbered claim 10, lines 2 and 9, change "expanding" to —expansion.

Renumbered claim 11, lines 2 and 9, change "expanding" to—expansion—

Renumbered claim 12, lines 2 and 8, and 11, change "expanding" to —expansion—.

Renumbered claim 13, lines 2, 5 and 9, change "expanding" to —expansion—.

REMARKS.

Renumbered claim 9 has not been amended for the reason that applicant's attorneys do not believe that it comes within the inventions shown by Bray or Taylor. While Bray has a central delivery for the oil through pipe 16, the gas outlet 17 takes the gas from the apex of the cylindrical cone 3 which closes the top of the chamber. 4624

In Taylor we find a steam outlet arranged below the baffles, but not passing upwardly through the inlet. The construction claimed by applicant is "gas outlet means comprising a pipe passing upwardly through the oil inlet supporting the oil dividing means within the expansion chamber." This

construction enables applicant to provide a gas take-off within the envelope of oil which is flowing down the sides of the expansion chamber, and obviates the necessity of the gas passing upwardly through the descending film of oil as it passes from the cone 22 on to the sides of the chamber and yet permits the oil to be introduced through the same fitting which supports the hoods and gas take-off means.

Applicant's specification and claims are now written to define the peculiar arrangement of applicant's device, which is the means for causing the oil to be divided into a thin flowing body while giving off the natural gases carried in combination therewith, and applying pressure to the surface of the oil while undergoing this action. This results in maintaining all of the light, volatile liquids in combination with the oil and raising the gravity of the oil when delivered into the receiving tank.

In the Barker patent there are no means shown for expanding the oil in such a manner that it may flow in a thin film, but must fall from the head 8 either in a solid body, or if accompanied by suffi-

4625

cient pressure, in a sprayed or broken up condition.

The patent to Bray shows that the oil after being admitted into the expansion chamber is divided into drops or streams and flows downwardly in that condition.

In the patent to Cullinan the oil is delivered into the expanding chamber in a solid stream, while in the patent to Moore the oil is delivered through the pipe B at a point near the bottom of the chamber.

The patent to Taylor is not considered as being adaptable for the use of applicant's invention for the reason that no separation of oil and gas could be effected until both had passed the second baffle from the bottom, as a film of oil started on the upper baffle would flow downward to the lower edge and would fall over in a flowing mass on to the next succeeding plate, and any gas freed in the upper chamber would have to pass through such body of oil before it could escape into the chamber formed between the two upper baffles, and this same action would take place at each succeeding fall of oil from the edge of the baffle plates. This would cause an agitation of the oil which would have a tendency to carry off the lighter series of oil with the gas.

4626

Applicant has discovered that in order to maintain the lighter series of oils in combination with the heavier series when separating the gas, it is necessary to reduce the oil to a thin regularly flowing body which is not subjected to any breaking up action, and to permit the gas to escape therefrom without agitation.

All of the references cited would cause a breaking up of the flowing body of oil, or agitation thereof, and result in the carrying away of the light volatile oils with the gas.

In actual practice applicant has demonstrated that by the use of his separators the oil delivered therefrom has all of the light gasolines in permanent combination with the crude oil, such crude oil being from two to three degrees lighter, according to the Baume scale, than oil which had been passed

through other forms of separators. Affidavits to this effect will be furnished if the Examiner would care to have the same on file in this case.

None of the references cited show the invention as claimed in applicant's amended claims, nor would any of the devices disclosed in the references be capable of performing the function of applicant's device.

Favorable action is requested.

Respectfully submitted,

TOWNSEND & GRAHAM,
Attys. for Trumble.

FMT—H.

Div. 31, Room 169. Paper No. 4.

DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON

April 9, 1915.

Townsend and Graham,
Higgins Building,
Los Angeles, Cal.

Please find below a communication from the EXAMINER in charge of the application of M. J. Trumble, filed Nov. 14, 1914, Ser. No. 872,110, Crude Petroleum and Natural Gas Separator.

THOMAS EWING,
Commissioner of Patents.

This application has been reconsidered in view of the amendment filed March 15, 1915.

Claims 1 to 4, presented by the above amend-

ment, are each rejected on the patent of record to Bray 1,014,943.

Claims 5 to 13 inclusive are also held not to patentably distinguish from the patent of record to Bray and accordingly rejected.

In this patent to Bray, while the cones may be shown as perforated, these cones will nevertheless deliver the oil to the wall of the expansion chamber to flow downwardly thereover. This patent is also provided with means for automatically drawing off the heavy residue or deposit as well as means for allowing an overflow of the oil therefrom through the pipe 20. The gas is drawn off from the top of the chamber and whether this gas outlet is centrally located or eccentrically located is immaterial.

ELY,
Examiner, Div. 31.

STOKES.

Serial No. 872,110

Mail Room
Mar
30
1916
U. S. Patent Office

B

U. S. Patent Office,
Received
Mar 31, 1916
Division 31, Paper No. 5

Div. 31
Room 169,
M. J. Trumble,
Crude Petroleum and Natural Gas Separator,
Filed Nov. 14, 1914,
Ser. No. 872,110.

Los Angeles, Cal., Mar. 21, 1916.

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:–

In response to Examiner's letter of April 9, 1915, we amend as follows:

Insert new claims:

---

13 —~~14.~~ In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and means for taking gas from the central portion of said chamber.

B′

14 ~~15~~. In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and a gas outlet pipe supporting said cone and passing vertically upward through said inlet means, said pipe being arranged to take off gas from the apex of said cone.

Cls. 14—15.

REMARKS.

We cannot understand the Examiner's statement that the cones in the Bray patent will deliver oil to the wall of the expansion chamber. The cones Bray calls screens and they evidently make a tight closure with the walls of the chamber. An explanation is requested.

Very respectfully,
TOWNSEND & GRAHAM,
Attys. for Trumble.

FWH–H.

Div. 31, Room 169. Paper No. 6.

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE.

WASHINGTON.

April 8, 1916.

U. S. PATENT OFFICE
Apr. 8 1916
Mailed

Townsend & Graham,
Higgins Bldg.,
Los Angeles, Cal.

Please find below a communication from the EXAMINER in charge of the application of Milon J. Trumble, No. 872,110, filed Nov. 14, 1914, Crude Petroleum and Natural Gas Separator.

THOMAS EWING,
Commissioner of Patents.

This case as amended Mar. 30, has been considered.

In reconsidering the case in view of applicant's remarks, it is not seen wherein the applicant is justified in saying that the screens make a tight closure with the walls of the chamber. In the patent the casing 2 is provided with a series of brackets 10 to support the screens. This would not look as if the screens make a tight closure with the walls of the chamber. Furthermore, it is said that the oil or liquid passes down over the screens and into the cone 1. This would imply that the heavy liquid reaches the casing and passes down its walls. There does not seem to be any authority for assuming that the liquid will do otherwise. While the screens in the patent are perforated, it is evident that these perforations are for the passage of the separated gases on their way to the outlet pipe 17, since the heavy liquid would be too thick to pass therethrough.

Claims 14, 15, presented by the above amendment are rejected on the patent to Bray.

Claims 1 to 13, inclusive, are held not to patentably distinguish from the references of record, and are again rejected.

ELY,
Examiner.

STOKES.

Mail Room Serial No. 872,110 Paper No. 7
Dec.
4
1916
U. S. Patent Office

PATENT OFFICE
DEC 6 1916
DIVISION XXV

Div. 31,
Room 169,
Crude Petroleum and Natural Gas Separator,
Filed Nov. 14th, 1914,
Serial No. 872,110,
MILON J. TRUMBLE.

Los Angeles, Cal., Nov. 24, 1916

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:–

We have Examiner's letter of April 8th, 1916, and note the Examiner's theory of the operation of the invention of Bray. We cannot agree with this theory, and find nothing in the Bray patent to justify it.

Applicant's invention consists of a containing vessel, an imperforate cone adapted to spread the whole body of the oil to the outer edge of the vessel, and means for taking off gas from the interior of the cone near the center of the vessel.

In the Bray patent there is no means for spreading the oil, and even if the Examiner holds that screens 11, 12 and 13 spread a portion of the oil,

he cannot avoid the conclusion that oil will pass through a screen and that some oil will not be spread.

Moreover, if we adopt the Examiner's viewpoint and hold that the openings in the screens are to let the gas through, it is even more evident that the screens of Bray are not equivalent to the imperforate cones of Trumble. Bray put holes in his screens because he had to, to make his ap-

TRUMBLE, Ser. No. 872,110.

paratus work, whether we consider the gas or the oil as passing through the holes.

Moreover, Bray does not take off his gas below his screens, and the claims of Trumble are quite specific in stating that the gas is taken off inside the cone.

In addition to these broad structural and functional differences, some of the claims recite specific structure which Bray certainly does not show. We think the Examiner is deceived by a certain similarity in appearance of unessential features of the Bray and Trumble inventions.

A reconsideration and allowance is requested. As we have apparently reached an issue with the Examiner, we would request that he act as fully upon the claims as he would upon appeal.

Very respectfully,

TOWNSEND & GRAHAM,

Attys. for Trumble.

FWH—H.

[On reverse side:] U. S. Patent Office, Serial No. Received Dec. 5 1916 Division 31, Paper No.

Div. 25, Room 315 Paper No. 8.

FFD/OIL

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE.

WASHINGTON.

Jan. 10, 1917.

U. S. PATENT OFFICE
JAN 10 1917
MAILED

Townsend & Graham,
Higgins Bldg.,
Los Angeles, Cal.

Please find below a communication from the EXAMINER in charge of the application of Milon J. Trumble, Ser. No. 872,110, filed Nov. 14, 1914, for Crude Petroleum and Natural Gas Separator.

THOMAS EWING,
Commissioner of Patents.

In response to applicant's letter of Nov. 24, 1916:

On reconsideration of this case all the claims except claim 9 (original claim 8) may be allowed.

Claim 9 is held as met by the patent to Bray, of record. Claim 8 is further objected to as being indistinct in the use of the expression "means within the chamber to divide the oil to reduce the surface tension of the oil upon the gas contained therein."

J. H. LIGHTFOOT,
Examiner, Div. 25.

OIL.

Mail Room Serial No. Paper No.
Feb.
6
1917
U. S. Patent Office

Serial No. 872110, Paper No. 9.
PATENT OFFICE
FEB. 8, 1917
DIVISION XXV

Div. 25,
Room 315,
Milon J. Trumble,
For Crude Petroleum and Natural Gas Separator,
Filed Nov. 14, 1912,
Serial No. 872,110.

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:

We, the undersigned, having Power of Attorney in the above identified application giving us full power of substitution and revocation, hereby substitute for ourselves the firm of GRAHAM & HARRIS, Registration No. 10717, (the individual members of which firm are Frank L. A. Graham and Ford W. Harris), of 933 Higgins Building, Los Angeles, California, with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

Signed at Los Angeles, in the County of Los

Angeles, and State of California, this 24th day of January, 1917.

TOWNSEND & GRAHAM,

H.

Mail Room Serial No. 872,110 Paper No. 10
Dec.
20
1917

U. S. Patent Office

PATENT OFFICE
DEC 21 1917
DIVISION XXV

Div. 25,
Room 315,
Milon J. Trumble,
Crude Petroleum and Natural Gas Separator,

Los Angeles, Cal., December 11, 1917.

Hon. Commissioner of Patents,
Washington,
D. C.

Sir:

In response to Examiner's letter of January 10th, 1917, we amend as follows:

C Cancel claim 9.

Renumber the remaining claims.

REMARKS.

The above action being fully responsive, puts the case in condition for final allowance, which is respectfully requested.

Very respectfully,

GRAHAM & HARRIS,
Attys. for Trumble.

FWH—H.

Address Only Serial No. 872110
The Commissioner of Patents,
Washington, D. C.

2—181

AC.

DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.
WASHINGTON.

Jan. 18, 1918.

Milon J. Trumble, Assor.

Sir: Your APPLICATION for a patent for an IMPROVEMENT in

Crude Petroleum & Natural Gas Separator,

filed Nov. 14, 1914, has been examined and ALLOWED.

The final fee, TWENTY DOLLARS, must be paid not later than SIX MONTHS from the date of this present notice of allowance. If the final fee be not paid within that period, the patent on this application will be withheld, unless renewed with an additional fee of $15, under the provisions of Section 4897, Revised Statutes.

The office delivers patents upon the day of their date, and on which their term begins to run. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will require about four weeks, and such work will not be undertaken until after payment of the necessary fee.

When you send the final fee you will also send, DISTINCTLY AND PLAINLY WRITTEN, the

☞ IN REMITTING THE FINAL FEE GIVE THE SERIAL NUMBER AT THE HEAD OF THIS NOTICE.

☞ UNCERTIFIED CHECKS WILL NOT BE ACCEPTED.

name of the INVENTOR, TITLE OF INVENTION, AND SERIAL NUMBER AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If you desire to have the patent issue to ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of final fee.

After issue of the patent uncertified copies of the drawings and specifications may be purchased at the price of FIVE CENTS EACH. The money should accompany the order. Postage stamps will not be received.

Final fees will NOT be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

Respectfully,
JAMES T. NEWTON,
THOMAS EWING,
Commissioner of Patents.

GRAHAM & HARRIS,
933 Higgins Bldg.,
Los Angeles, Cal.

2—327.

CERTIFICATE OF DEPOSIT.

$20 Rec'd

Mar. 13, 1918, H

C. C. U. S. Pat. Office

MEMORANDUM

of

FEE PAID AT UNITED STATES PATENT OFFICE.

(Be careful to give correct Serial No.)

Serial No. 872,110. Series of 1900.

Inventor : Milon J. Trumble.

Patent to be issued to Milon J. Trumble, Francis M. Townsend and Alfred J. Gutzler.

Name of invention, as allowed: Crude Petroleum and Natural Gas Separator.

Date of Payment: May 8, 1918.

Fee: Final Fee by Certificate of Deposit #7201.

Date of filing: November 14, 1914.

Date of circular of allowance: January 18, 1918.

The Commissioner of Patents will please apply the accompanying fee as indicated above.

GRAHAM & HARRIS,
Attorneys.

Send patent to
GRAHAM & HARRIS,
933 Higgins Bldg.,
Los Angeles, Cal.

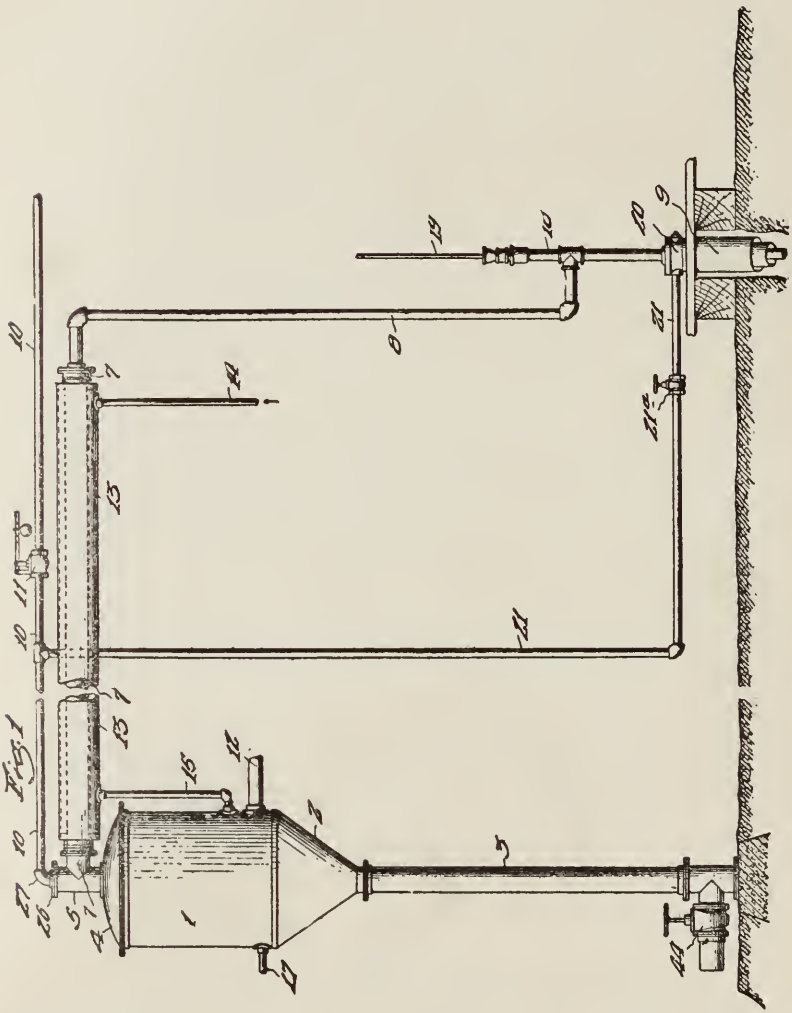
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914.

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 1.



Witnesses
J. Mansfield
Ford W. Harris

Inventor,
Milton J. Trumble;
Toronto & Graham
his attys.

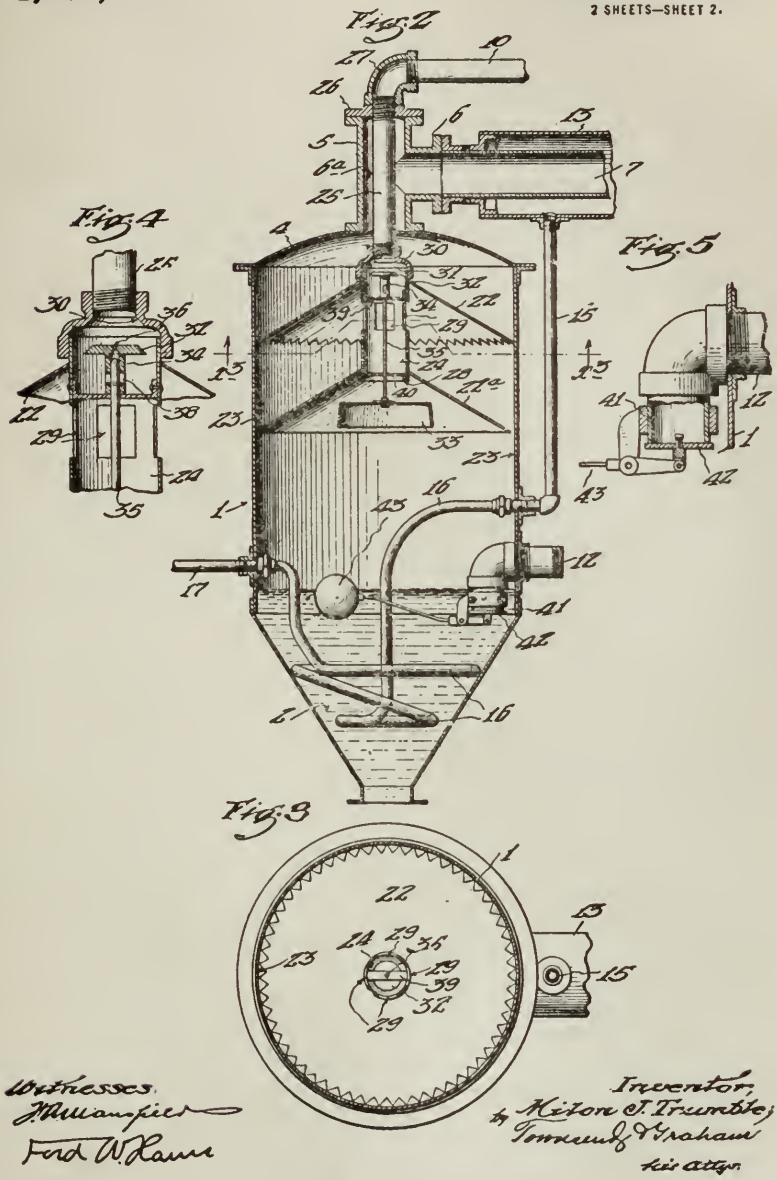
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

MILON J. TRUMBLE, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO FRANCIS M. TOWNSEND AND ONE-THIRD TO ALFRED J. GUTZLER, BOTH OF LOS ANGELES, CALIFORNIA.

CRUDE-PETROLEUM AND NATURAL-GAS SEPARATOR.

1,269,134. Specification of Letters Patent. Patented June 11, 1918.

Application filed November 14, 1914. Serial No. 872,110.

To all whom it may concern:

Be it known that I, MILON J. TRUMBLE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Crude-Petroleum and Natural-Gas Separator, of which the following is a specification.

My invention is designed to effect a separation of natural gas from the crude oil when the same is first delivered from the well, and is also designed to accomplish the cleaning of the oil from free water and sand at the same time.

My invention is also adapted to overcome the unseating of the pump valve in an oil well when an excess of natural gas is present with the oil, thereby materially increasing the amount of oil produced from wells where high pressure of gas exists.

My invention is also adapted to reduce the velocity and equalize the delivery of oil from wells in which the pressure of gas causes the oil to flow in gushes or by heads.

My invention is also effective in maintaining the lighter gravity series of the crude oil in combination with the heavier series of the oil, thereby producing from oil wells a product of lighter gravity than where the oil and gas is permitted to separate on exposure to ordinary atmospheric conditions.

My invention consists in the arrangement and combinations of parts as hereinafter set forth.

The accompanying drawings illustrate my invention and one method of its application:

Figure 1 is an elevation showing my invention as applied to an oil well, the velocity reducing means and gas line being broken to contract the view.

Fig. 2 is a vertical section of the expansion chamber and fragment of velocity reducing means and oil heating means.

Fig. 3 is an inverted section of the expansion chamber taken on the line x^3—x^3 Fig. 3.

Fig. 4 is an enlarged vertical section of oil stopper for gas line.

Fig. 5 is an enlarged view of the oil outlet, the lower end of the outlet pipe and closure therefor being shown in section.

As shown in the drawings the expansion chamber 1 is provided with a tapering settling chamber 2 which in turn communicates with and is supported by a stand pipe 3. The top 4 of the chamber is centrally perforated and a T 5, having its stem 6 disposed horizontally, is arranged to register with the central perforation in the top 4. Velocity reducing means, such as pipe 7, communicates with the horizontal stem 6 of the T 5 and delivers oil and gas into the interior of the chamber 1 through the vertical member 6^a of the T. The velocity reducing means 7, as shown, consists of a pipe many times greater in area than the oil pipe 8 which delivers the oil from the well 9.

A gas pipe 10 is arranged to lead the gas from the upper end of the T 5, and connects with the gas collector within the expansion chamber, which will hereafter be explained. A gas pressure regulating valve 11 is provided in gas pipe 10 and controls the passage of gas from the expansion chamber to any suitable receiver or destination.

Oil outlet means 12 is provided from the chamber at a point intermediate the settling chamber of the expansion chamber and the oil inlet means. When the character of the oil demands, oil heating means may be provided such as the steam jacket 13 which surrounds the velocity reducer 7. A steam pipe 14 is arranged to supply steam to such jacket. When desired a pipe 15 takes steam from the jacket 13 and delivers the same to a coil 16 arranged in the settling chamber 2 to further heat the oil within the chamber. The exhaust from the coil 16 is effected through pipe 17 which passes through the wall of the chamber.

A pump tube 18 having a sucker rod 19 is shown mounted on the casing head 20 of a well 9. A gas pressure pipe 21 is shown as connecting the gas pipe 10 with the casing head of the well to apply the pressure of the gas within the expansion chamber to the top of the oil within the well 9 which surrounds the pump tube 18. A valve 21^a may be provided in the pressure pipe 21 to regulate the pressure within the well, or such valve may be dispensed with, in which event the pressure on the oil surrounding the pump tube and the oil in the oil pipe 8 will be equalized.

Oil dividing means are provided interior

of the expansion chamber, such as cones 22 and 22ᵃ. Preferably these dividing cones are spaced apart, one below the other, as shown, with their peripheries nearly in contact with the wall of the chamber. The oil is delivered onto the upper surface of the cone 22 and spreads over the same evenly and is brought into contact with the wall 23 of the chamber and flows downwardly thereover until it is collected in the settling chamber. The cone 22ᵃ is provided as a supplemental spreader to insure the even distribution of the oil over the wall of the chamber. As shown in the form herein illustrated, the cones 22 and 22ᵃ are supported in the upper portion of the expansion chamber by means of gas collecting chamber 24 and pipe 25. Pipe 25 is screwed into flange 26 which in turn is seated upon and closes the upper end of the vertical member 6ᵃ of the T 5, to which is connected the elbow 27 of the gas pipe 10. The lower end of the pipe 25 is screwed into a reducer 30, arranged with its larger end looking downward to receive the upper end of the gas collecting chamber 24 which is open at its lower end 28. The gas collecting chamber is also provided with gas admitting ports 29, 29 and 29 arranged between the cones 22 and 22ᵃ which are protected thereby to prevent the entrance of oil into the gas line.

A valve seat 31 is provided in the reducer 30, and a valve stopper 32 is provided with means for seating the same when oil may rise within the chamber to a point where it may gain access to the gas line 10. As shown, this stopper 32 comprises a flat circular body having a beveled edge adapted to fit the valve seat in the reducer, and is provided with a perforated shank 34 through which the float rod 35, actuated by float 33, passes to open and close a vacuum breaker opening 36 in the stopper before actuating the stopper 32. A slot 38 is provided in the shank 34 which permits of the passage of a pin therethrough and through the float rod to limit the movement of such rod in breaking the vacuum to permit the unseating of the stopper.

The movement of the stopper, float rod, and float, away from the valve seat is limited by the end of shank 34 coming into contact with a bracket 39. A bracket 40 is arranged near the bottom of the gas collecting chamber to guide the float rod 35.

A trapped oil outlet from the chamber is provided which consists of a submerged pipe 41 provided with a closure 42 which is actuated by means of a float 43 which is so adjusted as to cause the pipe to be closed to the exit of oil before the level of oil reaches the open end of the pipe, to thereby prevent the escape of gas along with the outflowing oil from the chamber. Other forms of traps will readily suggest themselves, but the form herewith disclosed illustrates the function desired to be derived. A valve 44 is provided to permit sand and water to be drawn from stand pipe and settling chamber when desired.

It is to be remembered that an important feature of my invention is to provide means whereby the oil is divided into a thin or broken body whereby the gas may readily escape from its engagement therewith and it is also desirable to maintain the oil in its divided form for a period of time sufficient for all the gas to free itself from the oil. It is also desirable to maintain the oil in a quiescent condition for a short period of time within the settling chamber to permit sand and water to settle out of the same before the oil is drawn from the chamber.

In practice, oil is pumped from the well by actuating the sucker rod 19, which forces the oil through the pipe 8 to the velocity reducer 7 from which it flows through the T 5 onto the top of the cone 22 by which it is spread over the wall of the expansion chamber and envelops the gas collector. The oil may be heated while passing through the velocity reducer by means of the steam jacket 13 up to or about the boiling point of water. This heating will result in weakening the surface tension upon any water contained in the oil and allows the same to settle in the bottom of the chamber. The settling of the water may be materially assisted by the pressure of the gas within the chamber, and, if necessary, more heat may be applied to the oil by means of the steam coil 16.

In case oil is being taken from a well of the flowing type, and is intermittent in its heads, the velocity reducer will afford means for equalizing the flow of oil into the expansion chamber. In case a large amount of oil should be delivered to the expansion chamber, and the egress thereof should be slower than the amount coming in, the float 33 will actuate the stopper 32 and close the gas outlet to prevent oil from getting into the gas line. The gas pressure will then increase and thereby force the oil from the chamber until the float will drop down to open the gas line again. The pressure regulating valve 11 in the gas line 10 controls the exit of gas from the expansion chamber and thereby keeps a constant pressure on the oil within the chamber.

In the case of a wet gas, or a gas saturated with an oil of the lighter series, such as gasolene, it is desirable to maintain as high a pressure within the expansion chamber as may be practicable for the reason that a large amount of such light series will thereby be compressed and remain with the oil. In some instances this action has resulted in producing an oil three points higher in gravity, according to the Baumé

scale, than had been produced by subjecting the oil and gas to the atmospheric action to permit the gas to escape. This increase in lightness of gravity brought the producer an increase of price amounting to fifteen cents per barrel.

The admission of gas under pressure to the casing head of a well to equalize the pressure of gas within the pump tube, prevents the oil from slipping in the pump barrel on account of the valve being unseated by the upwardly flowing gas. This action as produced by my invention increases the pumping efficiency and the production of the well, thereby making profitable producers of wells that have theretofore been unprofitable.

The oil flowing from the expansion chamber through outlet 12 may be conducted to any suitable tank or receptacle either by the pressure of the gas within the chamber or by gravity.

When desired, a safety valve may be provided for the chamber 1 to permit escape of gas from the expansion chamber in the event that valve 32 should become stuck or remain seated on its seat. In some cases the float 33 and valve 32 may be dispensed with.

It will be noted that the action upon the oil while flowing down the wall of the expansion chamber in a thin film under pressure permits the free, dry, gas to readily escape therefrom, while the pressure exerted upon the oil surface backed by the wall of the chamber holds the lighter liquids, such as gasolene, in combination with the oil body, and I desire to be understood as pointing out and claiming this action as being of great benefit to the crude oil derived from the well on account of keeping the gasolene series in combinaton with the main body of oil.

I claim as my invention:

1. In an oil and gas separator, the combination of an expansion chamber arranged to receive oil and gas in its upper portion, means for spreading the oil over the wall of such chamber to flow downwardly thereover, gas take-off means arranged to take off gas from within the flowing film of oil, an oil collecting chamber below the expansion chamber, an oil outlet from said collecting chamber, and valve controlled means arranged to maintain a submergence of the oil outlet.

2. In an oil and gas separator, the combination of an expansion chamber, inlet means arranged to permit the entrance of oil and gas into the chamber, means within the chamber adapted and arranged to distribute the oil over the wall of the chamber in a downwardly flowing film, gas take-off means arranged to take gas from within the envelop of downwardly flowing oil, and means for maintaining gas pressure upon such oil.

3. In an oil and gas separator, the combination of an expansion chamber having a surface adapted to sustain a flow of oil thereover in a thin body, means for distributing oil onto such surface, pressure maintaining means arranged and adapted to maintain a pressure on one side of the flowing oil, withdrawing means arranged to take gas from the chamber, and means for withdrawing oil from the chamber.

4. In an oil and gas separator, the combination of an expansion chamber, means for delivering oil and gas into the chamber, means for maintaining pressure within the chamber, means for drawing oil from the chamber, and means within the chamber adapted to cause the oil to flow in a thin body for a distance to enable the gas contained and carried thereby to be given off while the oil is subjected to pressure.

5. The combination in an oil and gas separator of an expansion chamber having a settling chamber communicating therewith, means for delivering oil and gas into the upper portion of the expansion chamber, a cone arranged near the top of such chamber to receive the incoming oil and spread it over the wall of the chamber in a thin film like form, a gas collector arranged below the cone, gas outlet means from such collector, a float controlled valve arranged to close the gas outlet means, means for drawing oil from the separator above the settling chamber, and means for discharging sand or water from said settling chamber.

6. The combination in an oil and gas separator of an expansion chamber having a settling chamber communicating therewith, means for delivering oil and gas to the chamber, oil spreading and dividing means arranged to receive the oil within the chamber and spread it in a thin film like form over the wall of the chamber to flow theredown, gas collecting and outlet means arranged below the oil spreading means and within the flowing film of oil, a float controlled valve arranged to close the gas outlet when the oil rises to a predetermined height within the expansion chamber, a float controlled valved outlet from the separator whereby a predetermined depth of oil is maintained in the settling chamber to submerge the oil outlet and prevent the passage of gas therethrough and means for discharging sand or water from the settling chamber.

7. In a gas and oil separator, the combination of an expansion chamber, oil spreading means arranged within the chamber, oil supplying means arranged to deliver oil into such expansion chamber and onto the spreader means, gas collecting means arranged within the chamber, gas outlet means communicating with the gas

collecting means, oil outlet means from the expansion chamber arranged to draw oil from a point above the bottom thereof, such oil supplying means comprising an oil pipe from a suitable oil supply and a velocity reducing means connected therewith, whereby the oil and gas are delivered to the expansion chamber in quiescent condition.

8. In an oil and gas separator, the combination of an expansion chamber, means within the chamber adapted to spread the oil in a thin film like form over the wall of the chamber, gas outlet means leading from the chamber, consisting of a gas pipe, pressure regulating means arranged to control the passage of gas from the chamber through such gas pipe, oil outlet means arranged to draw oil from the expanding chamber, means to maintain such oil outlet means submerged within the body of oil in the chamber, velocity reducing means arranged to receive oil and gas from a source of oil supply and deliver the same into the expansion chamber, and means for heating the oil within the velocity reducing device before its entry into the expansion chamber.

9. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the T and into the expansion chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

10. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, a gas pipe depending from such bushing through the cross of the T and into the expansion chamber, means for delivering oil to the chamber through the stem of the T, means for heating the oil during its passage to such chamber, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

11. In an oil and gas separator, the combination of an expansion chamber having a centrally perforated top, a T arranged with one end of its cross to register with the central perforation in the top and having its stem disposed horizontally, a bushing on the upper end of the cross of the T, a gas pipe leading from such bushing, means for regulating the flow of gas from such expansion chamber through such gas pipe to maintain pressure within such chamber, a gas pipe depending from such bushing through the cross of the T and into the expanding chamber, means for delivering oil to the chamber through the stem of the T, oil dividing means secured to the lower end of the last named gas pipe, and means for drawing oil from the chamber.

12. In an oil and gas separator, the combination of an expansion chamber, a settling chamber communicating therewith adapted to receive the oil and retain the same in a quiet condition for a period of time, a stand pipe arranged to support the expansion chamber and settling chamber and to receive sand and water from the settling chamber, a submerged and trapped outlet for the oil arranged to draw oil from the separator, means for introducing oil into the expansion chamber, means adapted to divide the oil within the chamber, a gas outlet from the chamber, and means for preventing oil entering such gas outlet.

13. In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and means for taking gas from the central portion of said chamber.

14. In an oil and gas separator, an expansion chamber; inlet means for feeding a foam composed of oil and gas through the central part of the top of said expansion chamber; an imperforate spreader cone, having its apex pointing upwardly, located inside said chamber in such a manner as to spread a thin film of oil over the inner wall of said chamber, and a gas outlet pipe supporting said cone and passing vertically upward through said inlet means, said pipe being arranged to take off gas from the apex of said cone.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 9th day of November, 1914.

MILON J. TRUMBLE.

In presence of—
F. M. Townsend,
A. J. Gutzler.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

1914.

CONTENTS:

1. Application papers.
2. Rejection Dec. 2, 1914.
3. Amend't A. Mch. 15, 1915.
4. Rejection, April 9, 1915.
5. Amendment B, Mch. 30, 1916.
6. Rejection, April 8, 1916.
7. Letter to Office, Dec. 4, 1916.
8. Rej. Jan. 10, 1917.
9. Sub. P. Att'y Feb. 6, 1917.
10. Amend't C, Dec. 20, 1917.

183–105 25

105 Gas Sep. Serial No. 872,110 Div. 31 260 461

2 Sheets—Sheet 1

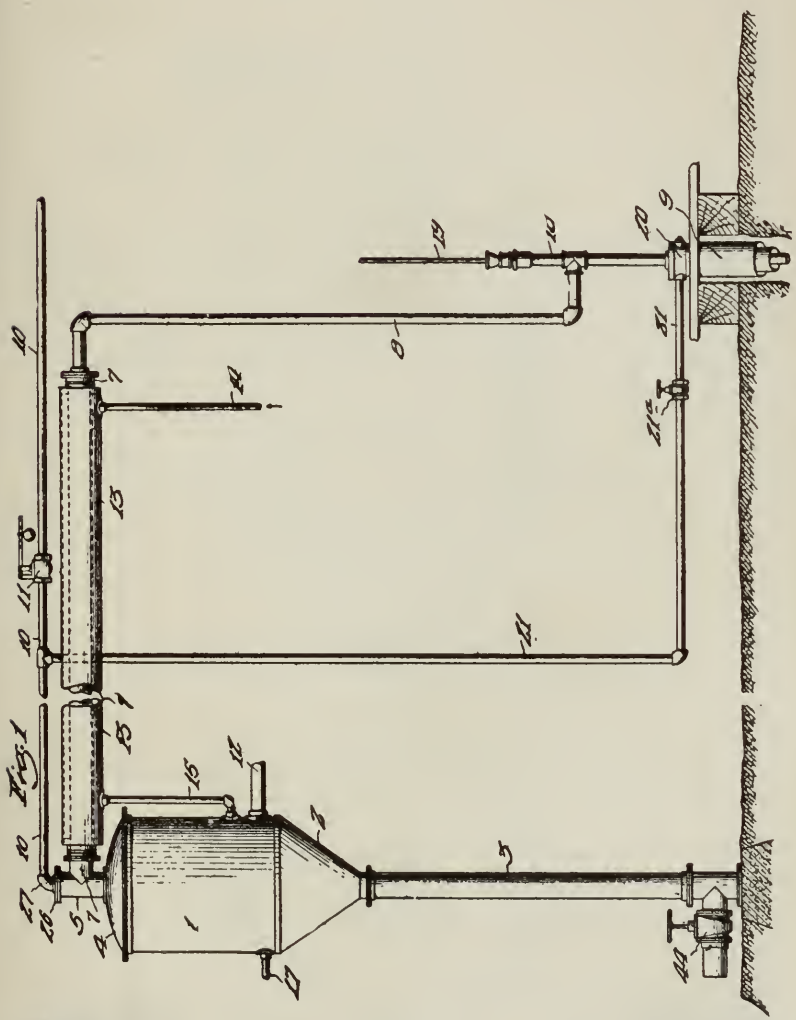
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 1.



Witnesses
H. Mansfield
Ford W. Harris

Inventor,
Milton J. Trumble,
Townsend & Graham
his Attys.

105 Serial No. 872,110 Div. 25 31

2 Sheets—Sheet 2

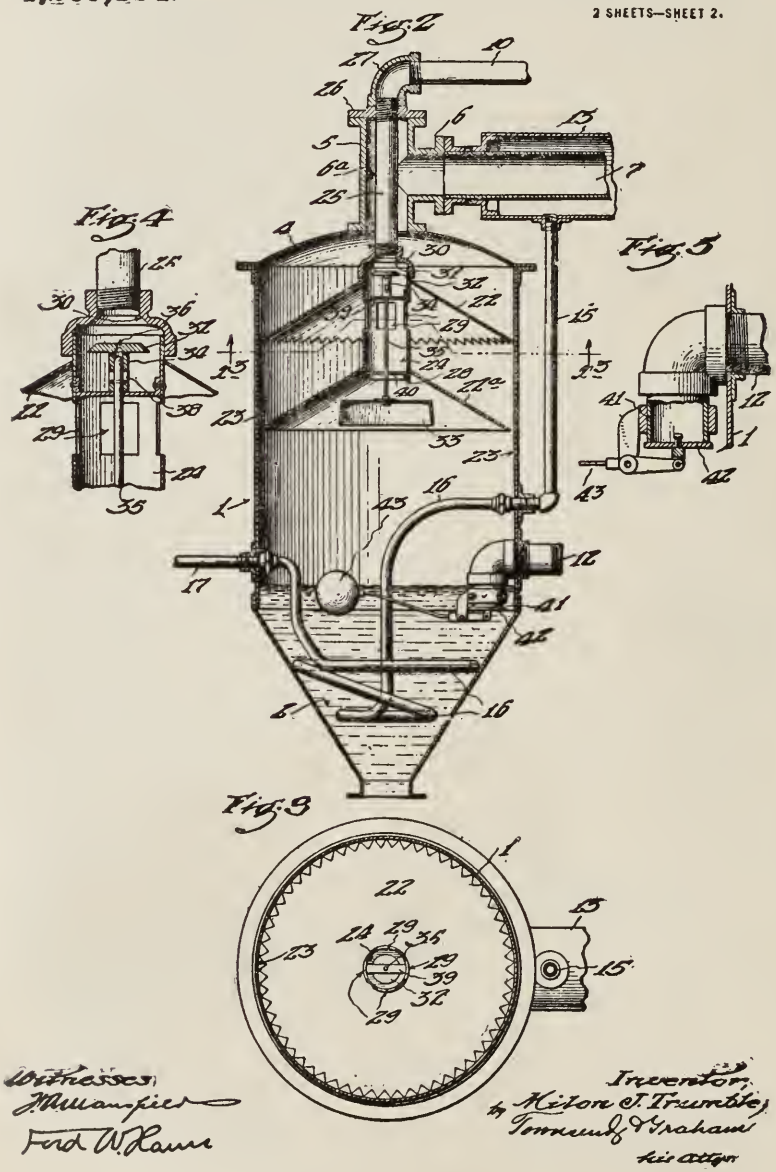
M. J. TRUMBLE.

CRUDE PETROLEUM AND NATURAL GAS SEPARATOR.

APPLICATION FILED NOV. 14, 1914

1,269,134. Patented June 11, 1918.

2 SHEETS—SHEET 2.



[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Plffs. Exhibit 2. Filed March 22, 1922. Chas N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Plaintiff's Exhibit No. 3.

[Endorsed]: E–113—Eq. Townsend vs. Lorraine. Plaintiff's Exhibit 3. Filed March 22, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

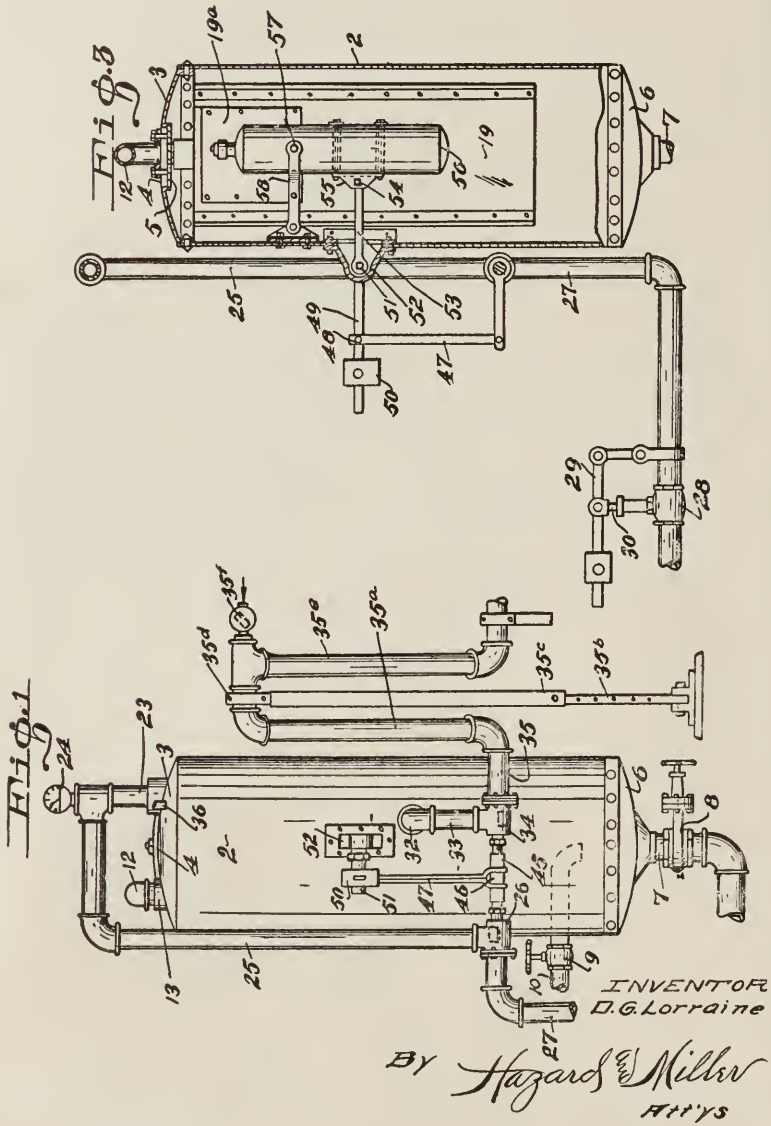
D. G. LORRAINE.

GAS, OIL, AND SAND SEPARATOR.

APPLICATION FILED FEB. 5, 1920.

1,373,664. Patented Apr. 5, 1921.

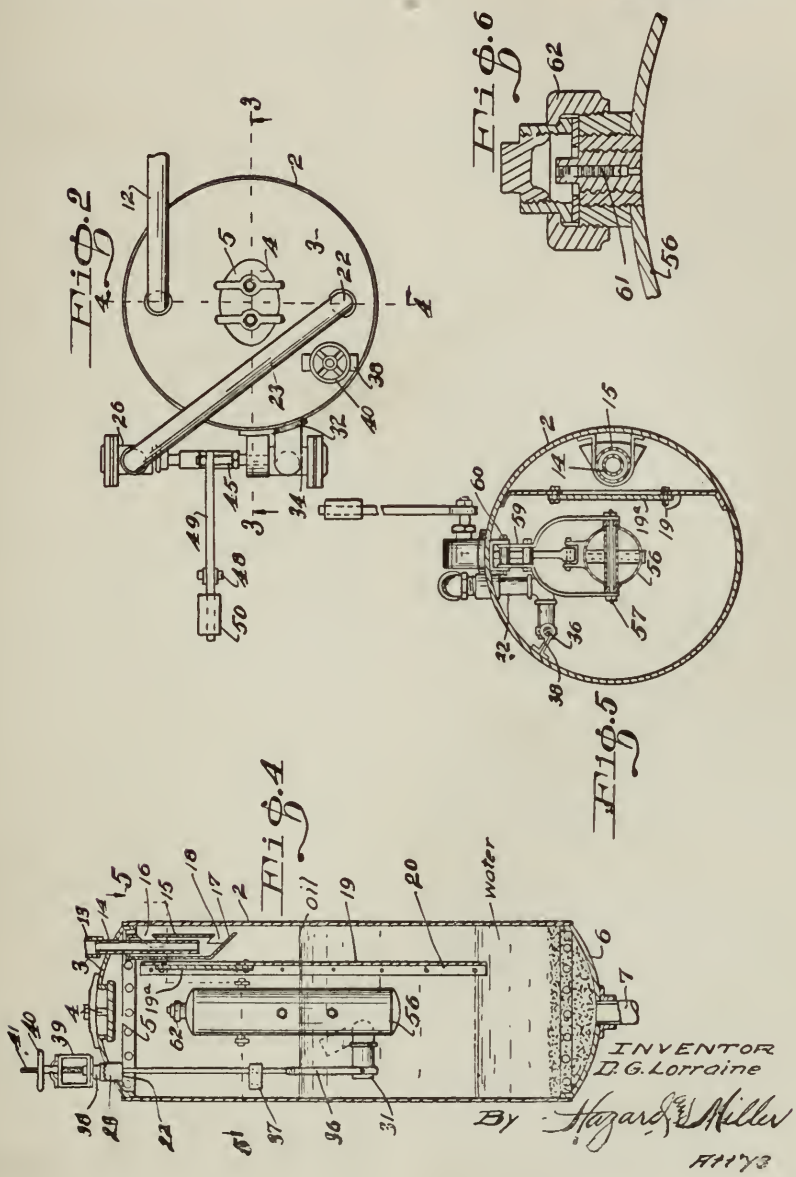
2 SHEETS—SHEET 1.



D. G. LORRAINE.
GAS, OIL, AND SAND SEPARATOR.
APPLICATION FILED FEB. 5, 1920.

1,373,664. **Patented Apr. 5, 1921.**

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

DAVID G. LORRAINE, OF LOS ANGELES, CALIFORNIA.

GAS, OIL, AND SAND SEPARATOR.

1,373,664. Specification of Letters Patent. Patented Apr. 5, 1921.

Application filed February 5, 1920. Serial No. 356,438.

To all whom it may concern:

Be it known that I, DAVID G. LORRAINE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Gas, Oil, and Sand Separators, of which the following is a specification.

This invention relates to apparatus for the efficient separation of gas and oil and especially for the separation of these substances when same are recovered from oil wells, and an object of the invention is to provide an apparatus for the effectual recovery of the gaseous content of emulsified oils as well as for the separation of oils and gas when the same is not in the form of an emulsion. The invention has also for an object to provide an apparatus in which as few parts as practicable are arranged within a separating chamber and to provide for ready access to the said parts; and another object is to provide for the arrangement and organization of other elements wholly exterior to the separating chamber so that necessary adjustments, attention, and replacements may be given and had without the necessity of dismantling or materially interrupting the operation of a plant.

A further object of the invention is to provide means for maintaining a pressure continuously on the oil or emulsion as it is continuously admitted to the separating chamber so that the emulsion may be subjected to sufficient pressure to express the gaseous constituent of the emulsion from the mixture.

Another object of the invention is to provide effectual means for automatically controlling the discharge, separately, of the oil and gases from the apparatus and especially to provide a pneumatic device adapted to stand the pressures that may obtain within the separating chamber.

Another object of the invention is to provide hydrostatic means for controlling the discharge of oil and for preventing the loss of gas with the outwardly passing oil and to provide such a hydrostatic means readily variable to afford different heads of oil pressure to overcome the interior pressure during the operation of the apparatus.

Another object of the invention is to provide for the minute adjustment of the oil discharge mechanism.

Another object is to provide an organization in which the several parts are simple in construction, readily removable and renewable, and to provide coördinate valve means operative by a single connection with the said pneumatic control means.

A further object of the invention is to provide a novel method for treating oil emulsions to facilitate the recovery of the gaseous content of the emulsion.

With these and other objects in view the invention consists of the method, the combination and in details and arrangements of the parts, an embodiment of the invention being illustrated in the accompanying drawings and described and claimed herein.

Figure 1 is a side elevation of the improved apparatus.

Fig. 2 is a top plan view of the apparatus.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is a detail sectional view of the upper portion of the pneumatic float.

The apparatus includes, preferably, an upright cylindrical tank or receptacle 2 of any suitable dimensions having a head 3 that has a manhole 4 which is shown in Fig. 2 as closable by a manhole plate 5. The lower end of the tank is provided with a bottom 6 having a central outlet pipe 7 in which is provided a cut-off valve 8 which, when opened, will provide for the washing out of such material as sand or other substance collecting in the bottom of the receptacle 2 and which discharge may be facilitated by the introduction of water or other fluid under pressure by the opening of a valve 9 arranged in a pressure pipe 10 at one side, and in the lower portion, of the receptacle 2.

Oil or emulsion to be treated is introduced, preferably, through the top 3 of the receptacle to which is connected a supply pipe 12 leading in through a connection 13 on the top of the receptacle and which connection is shown in Fig. 4 as including a downwardly extending tube 14 having around its lower end a sleeve or hood 15 provided at its upper portion with a gas outlet 16; the lower end of the sleeve 15 having an inclined bottom 17 below the open mouth 18 formed in the side of the sleeve and which mouth is disposed toward the ad-

jacent surface of the wall of the receptacle 2. The inlet sleeve 15 is arranged, as shown in Figs. 2 and 4, as in close juxtaposition to one side of the cylindrical receptacle; and extending vertically and transversely across this receptacle there is provided a partition wall 19 the flanges 20 of which may be riveted or otherwise secured as at 21 to the interior surface of the receptacle 2.

The lower end of this partition 19 terminates well above the bottom of the receptacle and the partition forms a confined vertical passageway down which the oil issuing from the mouth 18 of the inlet sleeve 15 is directed and is caused to pass beneath the lower edge of the partition 20 before the lighter materials, such as gas and oils, can rise to a predetermined variable height in the receptacle. This enables the sand that may be obtained in the oil or emulsion, coming from the supply pipe 12, to settle toward the bottom while the oil passes around the lower edge of the partition and ascends in the larger compartment formed on the opposite side of the partition.

The accumulating gases ascending to the top of the receptacle pass into an outlet 22 and into a gas pipe 23 in which may be provided a gage 24. The outwardly passing gas flows down a pipe 25 in the lower end of which is mounted a valve 26 controlling the flow from the receptacle 2. From the valve 26 is continued a delivery gas pipe 27 in which there is mounted a valve 28, Fig. 3, designed to hold a predetermined back pressure in the gas line and receptacle 2; the valve, in this case, being provided with a weight lever arm 29 connected to the stem 30 of the valve.

Oil is discharged from the receptacle through an adjustable outlet consisting, in this case, of an elbow 31 turnable about an axis in the connection 32 which is extended to the outside of the receptacle 2 and has a downturned branch 33 leading into an oil regulating valve 34 from which the oil passes into a delivery pipe 35.

One of the features of the present invention resides in means for very carefully adjusting the level of the outlet member 31 as by swinging it about its axis in the member 32; and to secure this refinement of adjustment the outlet member has attached to it a link or rod 36 extending up through a guy 37 and thence through a bearing 38, Fig. 2, to which is attached a yoke or other suitable member 39 to which is rotatively secured a handwheel 40 that engages the upper threaded end 41 of the rod 36. Therefore, by turning the handwheel 40 in one or the other direction it will lift or lower the rod 36 and consequently set the opening of the outlet member 31 at a desired position so as to enable the separation or outflow of the oil at or above a desired predetermined level with respect to the liquid content of the receptacle 2, as it is obvious that the oil will vary in clarity according to the specific gravity of its constituents and the upper portion of a mass of oil is therefore clearer than the lower portion, and to secure the separation of this clearer or better quality the outlet member 31 is made adjustable.

A further feature of the present invention resides in the provision of a buoyant yet substantial means for automatically controlling the opening and closing simultaneously of the gas outlet valve 26 and the oil outlet valve 34, and to that end these valves are shown as mounted on a common rock shaft 45 on which is provided a lever 46 to the outer end of which is connected a link 47 the upper end of which is attached at 48 to a lever arm 49 on which may be adjusted a counterbalancing weight 50.

The lever arm 49 is secured to the contiguous end of a short rock shaft 51 mounted in a box 52 attached to the side of the receptacle 2 this box having diverging walls forming a mouth opening to the interior of the receptacle 2, and in this mouth there oscillates a lever 53 attached to the portion of the shaft 51 extending into the box 52. The swinging end of the lever 53 is pivotally connected at 54 to a bearing 55 that is attached to the adjacent side of a pneumatic cylinder 56.

For the purpose of stabilizing and maintaining this pneumatic cylinder in a vertical position it has connected to it at 57 the side arms of a yoke 58 which has rearwardly extending parallel arms 59 these being pivoted on a bearing 60 arranged within the receptacle 2; the length of the lever device 58 and the lever 53 being substantially equal and therefore holding the float 56 in an upright position and causing it to move in a vertical position at all times as determined by variation of the level of the oil in the receptacle 2.

As above mentioned there is maintained in the receptacle a gas pressure as determined by the adjustment of the pressure regulating valve 28, and it is desirable to provide, therefore, a pneumatic float as 56 which will not only be of a highly buoyant characteristic but also will be able to withstand the exterior pressures applied without crushing, and therefore, the float 56 is made in the form of a hollow cylinder and has at its upper end a check valve 61 that may be covered by a removable cap 62, and the pneumatic float 56 may be charged with compressed air or gas to any desired degree or equal to the maximum at which pressures would be maintained in the receptacle 2.

The operation of the apparatus is substantially as follows:

The valve 28 having been set by its regulating means 29 to hold a given pressure in

the receptacle 2 then as oil and gas is supplied to the receptacle by the oil supply pipe 12 the latter will be directed down the small compartment through the inlet or feed sleeve 15 by which the oil is showered on to the adjacent portion of the receptacle wall whence it flows downwardly between the wall and the partition 19 any gases being liberated rising to the top of this compartment and passing over the upper end of the partition 19 and accumulating in the upper end of the receptacle 2.

The oil mass, or emulsion in some cases, passes beneath the lower end of the partition 19 and thus facilitates the deposit or separation of solids such as sand or other heavy substances, and the lighter portion of the oil with the gas and the emulsion rises into the larger compartment of the receptacle and passes upwardly to a level that is determined by the position of the pneumatic float 56. The gas will be compressed to a pressure substantially equal to that determined by the valve 28 and maintained there, and as the oil accumulates it will lift the float 56 and through means of the lever arm 53 rock the rock shaft 51 and through means of its connection to the valve shaft 45 rock the latter so as to open or increase the opening of the oil valve 34 and permit the discharge of oil through the outlet member 31 past the valve 34 and to the discharge 35. Thereupon the level of the oil will fall until in such action the float 56 in descending will again close or partially close the oil valve 34 and open or increase the opening of the gas valve 26. This alternate action of the automatic valve mechanism will continue so long as oil is supplied by the main oil pipe 13 to the apparatus.

From the above it will be seen that I have provided a method for separating or facilitating the separation of the gas and oil and separately discharging the same from emulsions; and furthermore have provided a method in which, by maintaining a predetermined pressure in the oil receptacle, the latter is subjected to pressures having the effect of expressing the gaseous content from emulsions, the gaseous constituent in the emulsion being driven from the denser liquids by the increase in the pressure on the oil within the receptacle 2. This, therefore, prevents the loss of the valuable gaseous constituent such as occurs in apparatus in which the oil passes immediately from a well or other source to an apparatus in which it is subject only to atmospheric pressure.

In the event of treating oils that are not emulsified the valve 34 may be omitted or may be fixed open and a static head or pressure may be secured by maintaining a column of oil in the discharge pipe 35 by providing the latter with a safety extension 35^a. This extension is shown as in the form of a U-shaped pipe stem that is turnable from a horizontal to an upright position about the axis of the pipe 35 and may be temporarily and substantially secured in its angular adjustment by a suitable jack comprising for instance a post 35^b having a sleeve 35^c the upper end of which engages the cross or top section of the siphon tube as at 35^d.

For the purpose of breaking the siphon effect in one branch as 35^e of the tube an inwardly opening check valve 35^f is mounted, preferably, in the bend of the siphonic device so that the oil will not be drawn from the branch to which the pipe 35 is connected but will be maintained therein to prevent drawing out of the gas from the receptacle 2.

Preferably water is maintained in the bottom of the receptacle to a level somewhat above the lower end of the sand sheet or partition so that the incoming supply of oil when passing below the lower end of the partition is brought into contact with the water and the attrition between the emulsion causes a rapid separation of the gaseous content as the oil and mixture engages the water.

It has been found from practical experience in the operation of this apparatus that there is an increase in the production of oil from some wells because of the back pressure in the well line which prevents the rapid increment in the quantity of sand ordinarily found in wells, and which increment results in the clogging or jamming of the well and loss of production until the well is blown.

The sand sheet 19 is, preferably, provided with a window opening that may be covered by a cover plate 19^a through which the member 15 may be applied and removed when necessary.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. In an apparatus for separating gas and oil from oil wells comprising a receptacle, a vertical partition arranged in the receptacle and terminating short of the top and bottom of the receptacle, and means arranged between the said partition and a contiguous wall of the receptacle for introducing the oil from the well whereby the oil is caused to flow downwardly and around the lower end of the partition and rise on the opposite side and the gas that freely escapes from the oil rising to the top of the receptacle and collecting above the upper end of the partition; said means including an inlet oil tube arranged in the upper part of the receptacle, said tube having a surrounding discharge sleeve with a deflecting bottom plate for discharging the oil toward the receptacle wall.

2. In an apparatus for separating gas and oil from oil wells comprising a receptacle,

. vertical partition arranged in the receptacle and terminating short of the top and bottom of the receptacle, and means arranged between the said partition and a contiguous wall of the receptacle for introducing the oil from the well whereby the oil is caused to flow downwardly and around the lower end of the partition and rise on the opposite side and the gas that freely escapes from the oil rising to the top of the receptacle and collecting above the upper end of the partition; said means including an inlet oil tube arranged in the upper part of the receptacle, said tube having a surrounding discharge sleeve with a deflecting bottom plate for discharging the oil toward the receptacle wall; said sleeve having upper and lower outlets for gas and oil respectively.

3. In an apparatus for separating oil and gas, a receptacle having separate discharge means for the oil and gas, each having an exterior valve actuated by a common crank, said valves being set for one to open as the other closes and float means within the receptacle actuated by the height of the liquid, operatively connected to said crank to actuate said valves.

4. In an apparatus for separating oil and gas, the combination of a receptacle having oil inlet means, separate oil and gas outlet means comprising pipes extending from the interior of said receptacle, stop cocks arranged in said pipes, one to open as the other closes and actuated by a common crank, float means within the receptacle operatively connected to said common crank adapted to actuate the valves with reference to the height of the liquid within the receptacle.

5. In an apparatus for separating gas and oil the combination of a receptacle, a float within the receptacle for actuating gas and oil outlet valves, said float comprising a sealed chamber, two supporting arms of equal lengths pivoted to said float at their proximal ends and pivoted to the wall of the receptacle at their distal ends to hold the chamber in substantially vertical alinement during movement thereof, the pivotal centers of said arms being off-set in vertical alinement at their distal ends, one of said arms having an extension thereon extending through the wall of the receptacle and being operatively connected to an actuating arm of said valves.

In testimony whereof I have signed my name to this specification.

DAVID G. LORRAINE.

Plaintiff's Exhibit No. 4.

[Endorsed]: E–113—Eq. Townsend vs. Lorraine. Plaintiff's Exhibit 4. Filed March 22, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

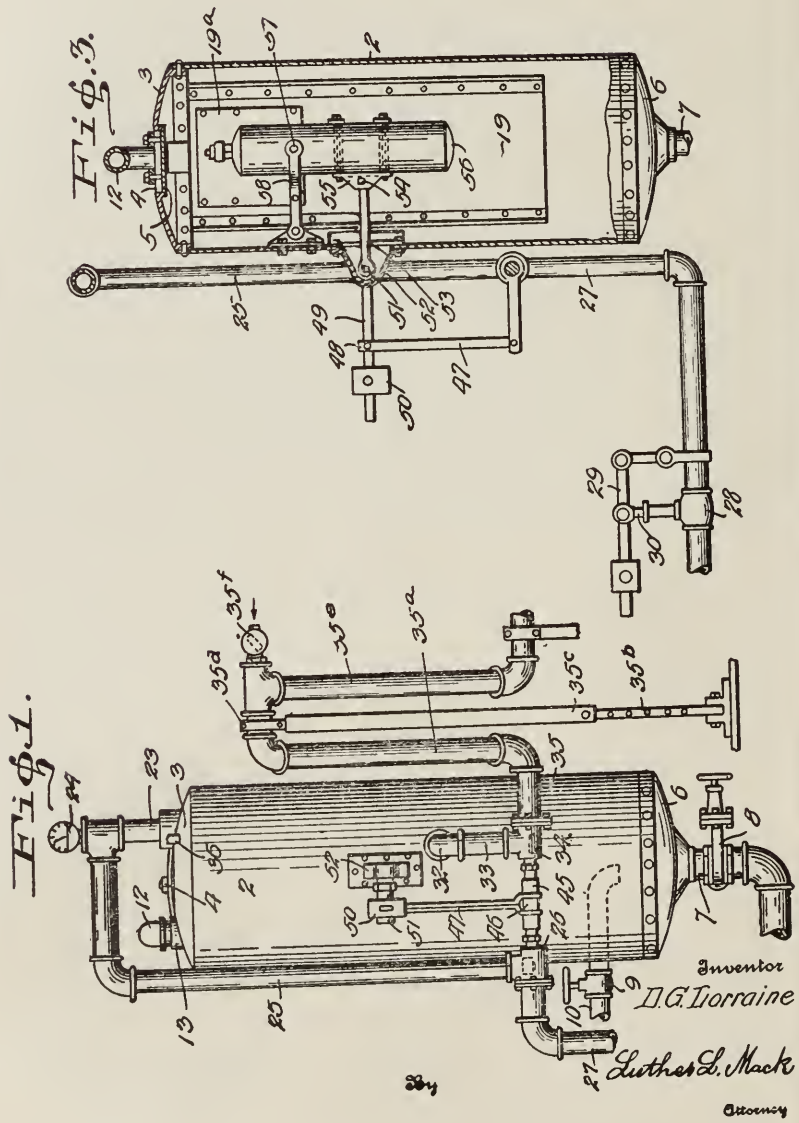
D. G. LORRAINE.

OIL, GAS, AND SAND SEPARATOR.

APPLICATION FILED JULY 18, 1921.

Reissued Nov. 8, 1921. **15,220.**

2 SHEETS—SHEET 1



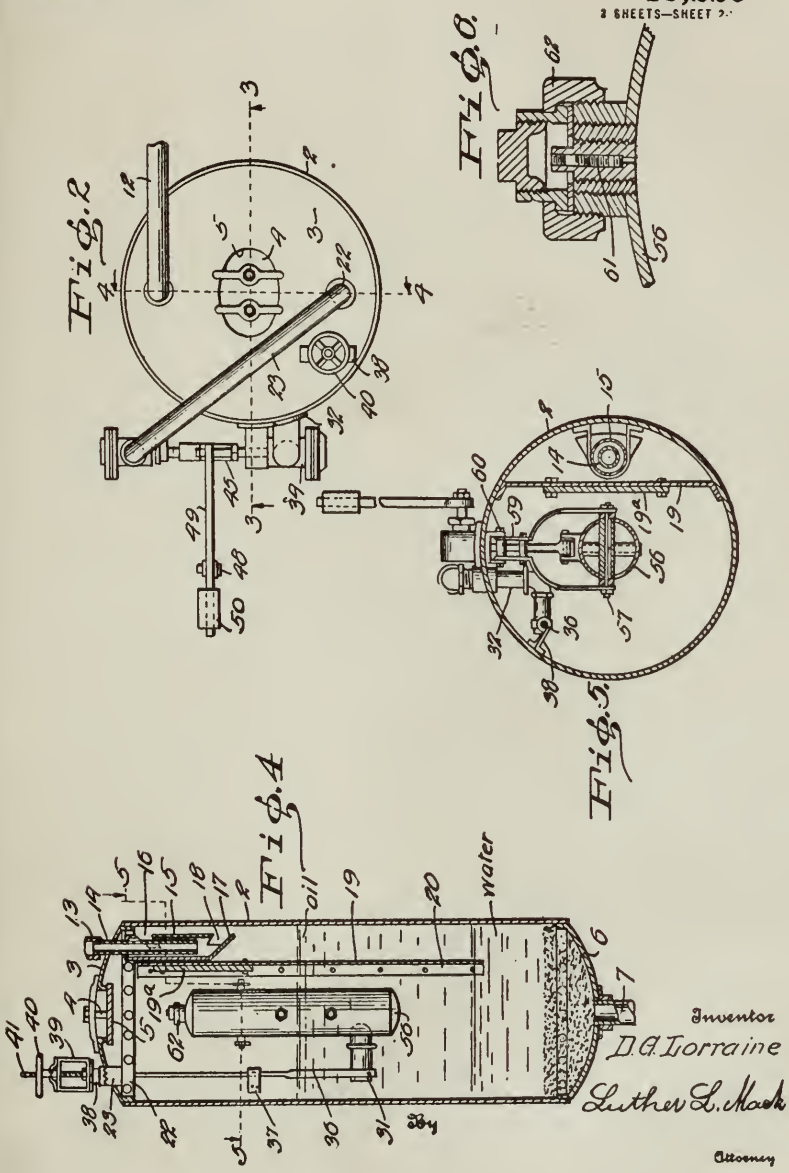
D. G. LORRAINE.

OIL, GAS, AND SAND SEPARATOR.

APPLICATION FILED JULY 18, 1921.

Reissued Nov. 8, 1921. **15,220**

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

DAVID G. LORRAINE, OF LOS ANGELES, CALIFORNIA.

OIL, GAS, AND SAND SEPARATOR.

15,220. Specification of Reissued Letters Patent. Reissued Nov. 8, 1921.

Original No. 1,373,664, dated April 5, 1921, Serial No. 356,438, filed February 5, 1920. Application for reissue filed July 18, 1921. Serial No. 486,317.

To all whom it may concern:

Be it known that I, DAVID G. LORRAINE, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Oil, Gas, and Sand Separators, of which the following is a specification.

This invention relates to and has for a primary object the provision of an apparatus for the efficient separation of gas and oil from oil wells, where the same is not in the form of emulsion, and does not contain sand and water and without pressure, and adaptable also for the purpose without modification, for maintaining a pressure whereby an emulsion may be broken up into its constituent elements.

It will be understood in the consideration of my invention that it is necessary and desirable to treat the oils obtained from the oil wells so as to thoroughly separate the gas and oil for different uses and so as to remove from the volume of oil all traces of water and sand which may be ejected from the well with the oil. To this end it is an object of my invention to provide an apparatus embodying a receptacle into which the volume of oil and accompanying substances is delivered from the well, for the purpose of separating the gas, water and sand therefrom. Said receptacle is preferably of substantial size and contents, so that a maximum volume of oil may be treated therein during the operation of the apparatus, and the separating operation facilitated.

Heretofore gas and oil separators have been so arranged as to provide a relatively shallow volume of oil, so that only a small volume may be treated at one operation, for the separation of the gas and other elements therefrom, and it is an object of my invention therefore to provide a receptacle of ample capacity, whereby a large volume and a substantially uniform level of oil may be maintained at a point above the mean elevation of the receptacle and in the major portion thereof, thereby rendering it possible to separate the gas from a maximum volume of oil. The upper and minor portion of the receptacle constitutes a gas collection or accumulation chamber from which the gas liberated from the oil is delivered by a suitable means to points remote from the separator for use.

It is a further object of my invention to sub-divide the interior of the gas and oil receptacle into two separate segmental chambers, by means of a vertical partition arranged therein and in communication at the top of the receptacle with the gas collection chamber, and at the bottom thereof with the oil receiving portion of the receptacle. The oil with its constituent elements is delivered from the well into the upper partition of the receiving chamber on one side of the said partition, which is relatively smaller than the other chamber of the receptacle, and the oil or emulsion rises to a higher level in the receiving chamber than the level of the volume of oil in the main chamber.

The arrangement of the said partition prevents the disturbance of the main volume of oil and permits the settling of the sand and water to the bottom of the tank, while the injection of the oil and its constituent elements from the well into the receiving chamber of the receptacle liberates a large volume of gas, as the oil enters the receptacle and thus the gas liberated collects in the upper portion of the receptacle. The heavier elements settle to the bottom of the tank and rise to and maintain a substantially uniform level in the main chamber thereof.

It is a further object of my invention to provide in an apparatus of the character described, means whereby the emulsified oil from oil wells may be injected by the natural pressure of the wells into and treated under pressure in the separating receptacle, for breaking up the emulsion into its constituent elements, so that the oil and valuable ingredients thereof may be withdrawn for use, and the other elements separated therefrom and whatever gas may be contained in the emulsion may be collected in the gas chamber of the receptacle.

Still another object of my invention is to provide effectual means for automatically controlling the discharge of the oil and gas from the apparatus separately and especially to provide a float device adapted to withstand the pressure that may remain within the separating receptacle and whereby the discharge of the gas and oil is effectually controlled.

Another object is to provide in an apparatus of the character mentioned, a receptacle having means capable of being employed for the separation of gas, oil, sand and water, and the accumulation of the gas in the upper portion of the receptacle without any pressure for the purpose of expelling the same for use, and also capable of being employed for demulsifying oils and reducing the same to their constituent elements, when the emulsion is supplied to the separating receptacle under pressure from the wells and whereby a substantial back pressure may be maintained in the gas discharge line for holding emulsion under a greater pressure within the receptacle than is necessary in the case of the separation of oil and gas in other forms than emulsion.

Another object of the invention is to provide hydrostatic means for separating the gas and oil and for preventing the loss of gas with the outwardly passing oil and to provide such a hydrostatic means readily variable to afford different heads of oil pressure to overcome the interior pressure during the operation of the apparatus, without overflowing the receptacle.

Another object of the invention is to provide for the minute adjustment of the oil discharge mechanism.

Another object is to provide an organization in which the several parts are simple in construction, readily removable and renewable, and to provide coördinate valve means operative by a single connection with the said pneumatic control means.

A further object of the invention is to provide a novel method for treating oil emulsions to break up and separate the ingredients of the emulsion.

With these and other objects in view the invention consists of the method, the combination and in details and arrangements of the parts, an embodiment of the invention being illustrated in the accompanying drawings and described and claimed herein.

Figure 1 is a side elevation of the improved apparatus.

Fig. 2 is a top plan view of the apparatus.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a section on line 5—5 of Fig. 4.

Fig. 6 is a detail sectional view of the upper portion of the pneumatic float.

The apparatus includes, preferably, an upright cylindrical tank or receptacle 2 of any suitable dimensions having a head 3 with a manhole 4 which is shown in Fig. 2 as closable by a manhole plate 5. The lower end of the tank is provided with a bottom 6 having a central outlet pipe 7 in which is provided a cut-off valve 8 which, when opened, will provide for the washing out of such material as sand or other substance collecting in the bottom of the receptacle 2 and which discharge may be facilitated by the introduction of water or other fluid under pressure by the opening of a valve 9 arranged in a pressure pipe 10 at one side. and in the lower portion, or the receptacle 2.

Oil or emulsion to be treated is introduced, preferably, through the top 3 of the receptacle to which is connected a supply pipe 12 leading in through a connection 13 on the top of the receptacle and which connection is shown in Fig. 4 as including a downwardly extending tube 14 which may have around its lower end a sleeve or hood 15 provided at its upper portion with a gas outlet 16; the lower end of the sleeve 15 may have an inclined bottom 17 below the open mouth 18 formed in the side of the sleeve and which mouth is disposed toward the adjacent surface of the wall of the receptacle 2.

The inlet sleeve 15 is arranged, as shown in Figs. 2 and 4, as in close juxtaposition to one side of the cylindrical receptacle; and extending vertically and transversely across this receptacle there is provided a partition wall 19, the flanges 20 of which may be riveted or otherwise secured, as at 21, to the interior surface of the receptacle 2.

The lower end of this partition 19 may terminate or have communication with the opposite chamber well above the bottom of the receptacle and the partition forms a confined vertical passageway or chamber down which the oil issuing from the mouth 18 of the inlet sleeve 15 is directed and is caused to pass beneath the lower edge of, or through the partition 20 before the lighter materials, such as gas and oils, can rise to a predetermined variable height in the receptacle. This enables the sand that may be contained in the oil or emulsion, coming from the supply pipe 12, to settle toward the bottom while the oil passes around the lower edge of or through parts in the partition and ascends in the larger compartment formed on the opposite side of the partition. The upper end of said partition may also terminate short of the top of the receptacle or have parts there in communication with the gas chamber.

The accumulating gases ascending to the top and minor portion of the receptacle pass into an outlet 22 and into a gas pipe 23 in which may be provided a gage 24. The outwardly passing gas flows down a pipe 25 in the lower end of which is mounted a valve 26 controlling the flow from the receptacle 2. From the valve 26 is continued a delivery gas pipe 27 in which there is mounted a valve 28, Fig. 3, designed to hold a predetermined back pressure in the gas line and receptacle 2; the valve, in this case, being provided with a weight lever arm 29 connected to the stem 30 of the valve.

Oil is discharged from the receptacle

through an adjustable outlet consisting, in this case, of an elbow 31 turnable about an axis in the connection 32 which is extended to the outside of the receptacle 2 and has a downturned branch 33 leading into an oil regulating valve 34 from which the oil passes into a delivery pipe 35.

One of the features of the present invention resides in means for very carefully adjusting the level of the outlet member 31 as by swinging it about its axis in the member 32, and to secure this refinement of adjustment the outlet member has attached to it a link or rod 36 extending up through a guy 37 and thence through a bearing 38, Fig. 2, to which is attached a yoke or other suitable member 39 to which is rotatively secured a handwheel 40 that engages the upper threaded end 41 of the rod 36 Therefore. by turning the handwheel 40 in one or the other direction it will lift or lower the rod 36 and consequently set the opening of the outlet member 31 at a desired position so as to enable the separation or outflow of the oil at or above a desired predetermined level with respect to the liquid content of the receptacle 2, as it is obvious that the oil will vary in clarity according to the specific gravity of its constituents and the upper portion of a mass of oil is therefore clearer than the lower portion, and to secure the separation of this clearer or better quality the outlet member 31 is made adjustable.

A further feature of the present invention resides in the provision of a buoyant yet substantial means for automatically controlling the opening and closing simultaneously of the gas outlet valve 26 and the oil outlet valve 34, and to that end these valves are shown as mounted on a common rock shaft 45 on which is provided a lever 46 to the outer end of which is connected a link 47 the upper end of which is attached at 48 to a lever arm 49 on which may be adjusted a counter-balancing weight 50.

The lever arm 49 is secured to the contiguous end of a short rock shaft 51 mounted in a box 52 attached to the side of the receptacle 2, this box having diverging walls forming a mouth opening to the interior of the receptacle 2, and in this mouth there oscillates a lever 53 attached to the portion of the shaft 51 extending into the box 52. The swinging end of the lever 53 is pivotally connected at 54 to a bearing 55 that is attached to the adjacent side of a pneumatic cylinder or float 56

For the purpose of stabilizing and maintaining the float cylinder in a vertical position it has connected to it at 57 the side arms of a yoke 58 which has rearwardly extending parallel arms 59 these being pivoted on a bearing 60 arranged within the receptacle 2, the length of the lever device 58 and the lever 53 being substantially equal and therefore holding the float 56 in an upright position and causing it to move in a vertical position at all times as determined by variation of the level of the oil in the receptacle 2.

When treating an emulsion as above mentioned, there is maintained in the receptacle a gas pressure as determined by the adjustment of the pressure regulating valve 28, and it is desirable to provide, therefore, a pneumatic float as 56 which will not only be of a highly buoyant characteristic but also will be able to withstand the exterior pressures applied without crushing, and therefore, the float 56 is made in the form of a hollow cylinder and has at its upper end a check valve 61 that may be covered by a removable cap 62, and the pneumatic float 56 may be charged with compressed air or gas to any desired degree or equal to the maximum at which pressure would be maintained in the receptacle 2.

The operation of the apparatus is substantially as follows:

When treating an emulsion, the valve 28, having been set by its regulating means 29 to hold a given pressure in the receptacle 2 then as the emulson is supplied to the receptacle by the oil supply pipe 12 the latter will be directed down the small compartment through the inlet or feed sleeve 15 by which the oil is showered onto the adjacent portion of the receptacle wall whence it flows downwardly between the wall and the partition 19, any gases being liberated rising to the top of this compartment and passing over the upper end of or through the partition 19 and accumulating in the upper end of the receptacle 2.

The oil mass, or emulsion in some cases, passes beneath the lower end of or through the partition 19 and thus facilitates the deposit or separation of solids such as sand or other heavy substances, and the lighter portion of the oil with the gas and the emulsion rises into the larger compartment of the receptacle and passes upwardly to a level that is determined by the position of the pneumatic float 56 The emulsion will be compressed to a pressure determined by the adjustment of the valve 28 and maintained there, and the emulsion will be broken up into its constituent elements thereby, and as the oil accumulates it will tend to lift the float 56 and through means of the lever arm 53 rock the rock shaft 51 and through means of its connection to the valve shaft 45 rock the latter so as to open or increase the opening of the oil valve 34 and permit the discharge of oil through the outlet member 31 past the valve 34 and to the discharge 35 Thereupon the level of the oil will tend to fall until in such action the float 56 in descending will again tend to close or partially

close the oil valve 34 and open or increase the opening of the gas valve 26. This alternate action of the automatic valve mechanism will continue so long as oil is supplied by the main oil pipe 13 to the apparatus. It will be understood, however, that the level of the fluid contents of the main chamber of the receptacle 2 will be at all times substantially uniform, and when the apparatus is properly adjusted this level will be maintained at a point well above the mean elevation of the receptacle so as to insure a maximum volume of oil from which the gas may be liberated and yet provide an ample space for the accumulation of the gas.

From the above it will be seen that I have provided a method for separating or facilitating the separation of the gas and oil and separately discharging the same from emulsion; and furthermore have provided a method in which, by maintaining a predetermined pressure in the oil receptacle, the latter is subjected to pressures having the effect of expressing the gaseous content from emulsions, the gaseous constituent in the emulsion being driven from the denser liquids by the increase in the pressure on the oil within the receptacle 2. This, therefore, prevents the loss of the valuable gaseous constituent such as occurs in apparatus in which the oil passes immediately from a well or other source to an apparatus in which it is subject only to atmospheric pressure.

In the event of treating oils that are not emulsified the valve 28 may be omitted and the gas provided with free outlet without pressure or a static head, or pressure may be secured by maintaining a volume of oil in the discharge pipe 35 by providing the latter with a safety extension 35[a]. This extension is shown as in the form of a U-shaped pipe stem that is turnable from a horizontal to an upright position about the axis of the pipe 35 and may be temporarily and substantially secured in its angular adjustment by a suitable jack comprising for instance a post 35[b] having a sleeve 35[c] the upper end of which engages the cross or top section of the siphon tube as at 35[d].

For the purpose of breaking the siphon effect in one branch as 35[d] of the tube an inwardly opening check valve 35[f] is mounted, preferably, in the bend of the siphonic device so that the oil will not be drawn from the branch to which the pipe 35 is connected but will be maintained therein to prevent drawing out of the gas from the receptacle 2.

Preferably water is maintained in the bottom of the receptacle to a level somewhat above the lower end of the sand sheet or partition or the part therein, so that the incoming supply of oil when passing below the lower end of or through the partition is brought into contact with the water and the attrition between the emulsion causes a rapid separation of the gaseous content as the oil and mixture engages the water.

It has been found from practical experience in the operation of this apparatus that there is an increase in the production of oil from some wells because of the uniform flow from the separator which prevents the rapid increment in the quantity of sand ordinarily found in wells, and which increment results in the clogging or jamming of the well and loss of production until the well is blown.

The sand sheet 19 is, preferably, provided with a window opening that may be covered by a cover plate 19[a] through which the member 15 may be applied and removed when necessary.

It will be understood that frequently the flow from oil wells is not uniform, the flow coming in impulses and varying in extent and pressure, and this occasions the delivery of sand to a more or less extent, which frequently stops the flow of oil from the well.

With the use of my apparatus, however, in connection with an oil well, because of the arrangement of parts and the connection between the well and the separating device, when a well is flowing a substantially uniform flow is maintained at all times, and the delivery of oil from the well is stabilized and prolonged frequently beyond the period of its natural flow, and the impulses are prevented also because of the complete regulation of the flow from the well. When connected with my separator sand is not encountered in sufficient quantities to stop or influence the flow and altogether a more uniform and satisfactory delivery from the well is maintained.

It will be further understood that because of the vertical partition within the separating receptacle and the provision of the separate receiving and separating compartments, the products of the well are delivered into the smaller receiving chamber and all of the agitation of the oil is effected in the receiving chamber, while the main volume of oil is maintained at a stationary level and without agitation in the larger settling chamber of the receptacle. Now, this in the case of oil and gas other than emulsion is effected without pressure. The tendency of oil and products is to create pressure when the same is agitated in the receptacle and by the provision of the partition receptacle described herein. This agitation and the consequent increase of pressure within the receptacle is entirely eliminated and the gas is allowed to flow freely from the gas collection chamber in the minor and upper portion of the receptacle.

The treatment of emulsions, however, requires a substantial pressure within the receptacle in order that the emulsion may be

broken up completely and the constituent elements thereof liberated and separated.

The pressure is maintained in the receptacle by means of the weight valve 23 which is not necessary for the treatment of the natural gas and oil.

What I claim is:

1. In an apparatus for separating gas and oil from oil wells comprising a receptacle, a vertical partition arranged in the receptacle and terminating short of the top and bottom of the receptacle, and means arranged between the said partition and a contiguous wall of the receptacle for introducing the oil from the well whereby the oil is caused to flow downwardly and around the lower end of the partition and rise on the opposite side and the gas that freely escapes from the oil rising to the top of the receptacle and collecting above the upper end of the partition, said means including an inlet oil tube arranged in the upper part of the receptacle, said tube having a surrounding discharge sleeve with a deflecting bottom plate for discharging the oil toward the receptacle wall.

2. In an apparatus for separating gas and oil from oil wells comprising a receptacle, a vertical partition arranged in the receptacle and terminating short of the top and bottom of the receptacle, and means arranged between the said partition and a contiguous wall of the receptacle for introducing the oil from the well whereby the oil is caused to flow downwardly and around the lower end of the partition and rise on the opposite side and the gas that freely escapes from the oil rising to the top of the receptacle and collecting above the upper end of the partition; said means including an inlet oil tube arranged in the upper part of the receptacle, said tube having a surrounding discharge sleeve with a deflecting bottom plate for discharging the oil toward the receptacle wall; said sleeve having upper and lower outlets for gas and oil respectively.

3. In an apparatus for separating oil and gas, a receptacle, having separate discharge means for the oil and gas, each having an exterior valve actuated by a common crank, said valves being set for one to open as the other closes and float means within the receptacle actuated by the height of the liquid, operatively connected to said crank to actuate said valves.

4. In an apparatus for separating oil and gas, the combination of a receptacle having oil inlet means, separate oil and gas outlet means comprising pipes extending from the interior of said receptacle, stop cocks arranged in said pipes, one to open as the other closes and actuated by a common crank, float means within the receptacle operatively connected to said common crank adapted to actuate the valves with reference to the height of the liquid within the receptacle.

5. In an apparatus for separating gas and oil, the combination of a receptacle, a float within the receptacle for actuating gas and oil outlet valves, said float comprising a sealed chamber, two supporting arms of equal lengths pivoted to said float at their proximal ends and pivoted to the wall of the receptacle at their distal ends to hold the chamber in substantially vertical alinement during movement thereof, the pivotal centers of said arms being off-set in vertical alinement at their distal ends, one of said arms having an extension thereon extending through the wall of the receptacle and being operatively connected to an actuating arm of said valves.

6. In an apparatus for separating gas and oil from oil wells, a receptacle having a vertical partition arranged therein and subdividing the interior of said receptacle into two separate chambers arranged for communication near the top and bottom portions thereof, and means in communication with one of said compartments for introducing the oil from a well thereinto, whereby the oil is caused to flow downwardly in said receiving chamber and into the lower portion of said other chamber and to rise on the opposite side of said partition, the gas being liberated from the oil in said receiving chamber and delivered therefrom to and discharged with the gas from the upper portion of said other chamber above the level of oil therein and accumulating therein for delivery to points externally of said receptacle.

7. In an oil and gas separating device, a receptacle for receiving the oil and gas from wells, a vertical partition fixed therein for subdividing the interior of said receptacle into a receiving chamber and a relatively larger settling chamber, said partition being arranged to afford communication near its top and bottom between said chambers, means for delivering a volume of oil and gas from a well into said receiving chamber whereby the gas may be liberated from the oil and discharged into the upper portion of and commonly discharged with the gas in said settling chamber and the oil caused to flow downwardly in said receiving chamber and into and to rise in said settling chamber, and means for regulating the supply and discharge of the oil to and from said receptacle, respectively, whereby the level of the oil in said settling chamber may be maintained at a substantially uniform elevation and substantially above the vertical center of the receptacle, for treating a maximum volume of oil therein.

8. In a gas and oil separating device for oil wells, a receptacle for receiving the oil from a well and having a vertical partition therein subdividing the interior of the receptacle into spearate chambers in communi-

cation at points near the top and bottom, the upper portion of the receptacle serving as a common receiver for the gas from both chambers, and means for supplying a volume of oil to and discharging the same from said receptacle, whereby a maximum volume of oil may be maintained at a substantially uniform level in said receptacle at a plane above the vertical center thereof, the gas liberated therefrom and accumulated above the level of the oil and the heavier constituents caused to settle to the bottom of said receptacle, as described.

9. An oil and gas separator for oil wells including a receptacle having a receiving compartment and a settling compartment arranged for communication at the top whereby the gas may be liberated from the oil introduced into said receiving compartment and discharged into the upper portion of and united with the gas in said other compartment, and also arranged for communication at the bottom whereby the oil may flow downwardly in said receiving compartment and into said other compartment and the other constituents separated therefrom.

10. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber, a vertical partition therebetween arranged open at the top for providing communication between said chambers, a gas outlet common to both of said chambers and means whereby a substantially uniform level of oil may be maintained in said settling chamber above the vertical center line of said receptacle.

11. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber arranged for communication near the top and bottom of the receptacle, and provided with a common gas outlet and float controlled means whereby the discharge of the oil from said receptacle is automatically regulated for maintaining a substantially uniform level of oil in the settling chamber, above the vertical center line of the receptacle.

12. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber, having a common outlet for the gas generated therein, a vertical partition therebetween arranged for affording communication between said chambers near the top and bottom of said receptacle, and float means in the upper portion of said settling chamber for regulating the discharge of the oil, whereby a substantially uniform level of oil may be maintained in said settling chamber above the vertical center line of said receptacle.

13. An oil and gas separator for oil wells including a receptacle having a vertical partition terminating short of the top and bottom thereof, and forming an oil receiving chamber and a settling chamber arranged for communication at the top in bottom of said receptacle, means for introducing a volume of oil from a well into said receiving chamber, the oil being delivered from the bottom of said receiving chamber into the bottom of said settling chamber, the gas from both of said chambers being united and commonly discharged and means whereby a substantially uniform level of oil may be maintained in said settling chamber above the vertical center line of said receptacle.

14. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber arranged for communication between the top and bottom of said receptacle, means for introducing a volume of oil from a well into said receiving chamber, the oil being delivered from the bottom of said receiving chamber into the bottom of said settling chamber, and float controlled means for regulating the discharge of oil from the settling chamber, whereby a substantially uniform level of oil may be maintained in the settling chamber above the vertical center line of said receptacle, the gas being liberated from the oil in said receiving chamber and being discharged into and from said settling chamber.

15. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber arranged for communication near the top and bottom of the receptacle, a vertical partition between said chambers, a pivoted float supported in the upper portion of said receptacle for regulating the discharge of the oil from the settling chamber, whereby a substantially uniform level of oil may be maintained in said settling chamber above the vertical center line of said receptacle.

16. An oil and gas separator for oil wells including a receptacle having an oil receiving chamber and a settling chamber arranged for communication near the top and bottom of the receptacle, a vertical partition between said chambers, a float supported in the upper portion of said receptacle for regulating the discharge of the oil from the settling chamber, whereby a substantially uniform level of oil may be maintained in said settling chamber above the vertical center line of said receptacle, and means for introducing a volume of oil from a well into the top of said receiving chamber, whereby the gas may be liberated from the oil so introduced, and discharged into the upper portion of said receptacle, above the level of the oil in the settling chamber, and a common outlet for the gas from both of said chambers.

17. An oil and gas separator for oil wells, including a receptacle having a receiving chamber therein for the reception of oil and its constituents, and a settling chamber com-

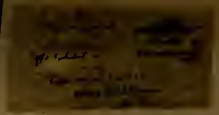
municating with said receiving chamber, a float mounted in the upper portion of said receptacle for regulating the discharge of the oil therefrom, whereby a substantially uniform volume and level of oil may be maintained in said settling chamber at a point above the vertical center of the receptacle.

18. An oil and gas separator for oil wells including a receptacle having a receiving chamber therein for the reception of oil and its constituents, and a settling chamber communicating with said receiving chamber, said receiving chamber and said settling chamber having a common outlet whereby the gas liberated from the oil in both chambers may be commonly discharged, a float mounted in the upper portion of said receptacle for regulating the discharge of the oil therefrom, whereby a substantially uniform volume and level of oil may be maintained in said settling chamber at a point above the vertical center of said receptacle.

19. An oil and gas separator for oil wells including a receptacle having a receiving chamber and a settling chamber in communication, a float in the upper portion of said receptacle, pivotally supported on the walls thereof, an oil discharge valve communicating with said settling chamber and externally mounted on said receptacle, and means for operatively connecting said float with said valve.

DAVID G. LORRAINE.

Witnesses.
J. W. Sheeley,
Luther L. Mack.



O CLUIU C[illegible]. OIL C[illegible] ANY
Tests of [illegible]rable Gas [illegible]p Under Varying
Pressures at Well 10/[illegible] [illegible]rch 2-12,1915.

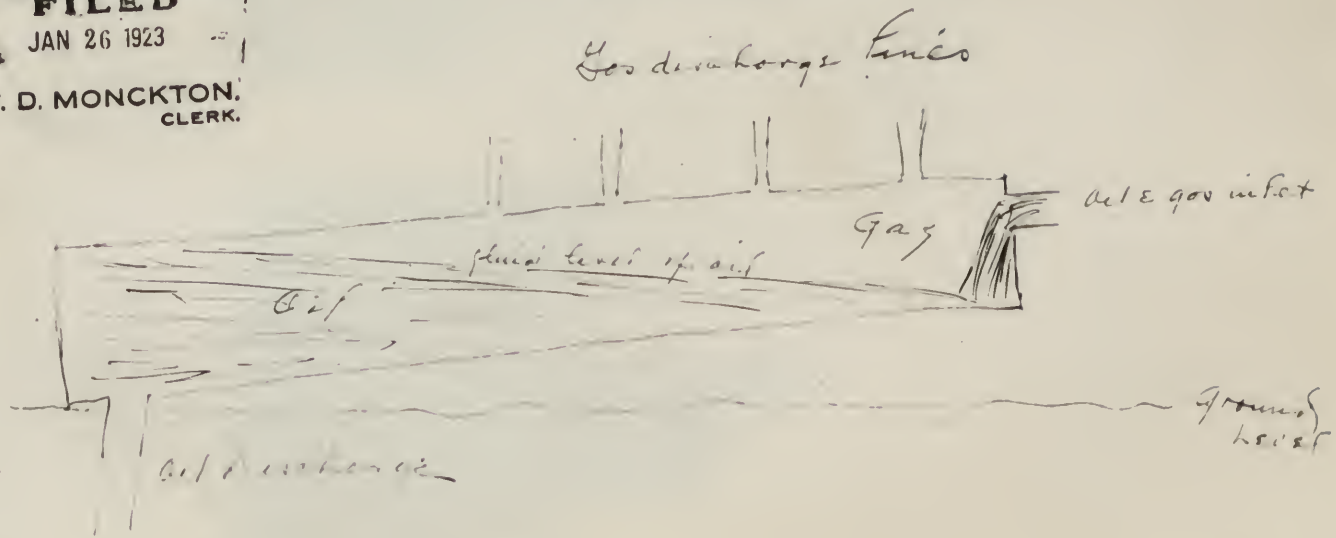
Pressure on trap.	Well Pressure.	Flow plug opening	OIL. Daily production.	Gravity in trap.	Gravity at tank inlet.	Gravity when shipped	GAS. Indicated pressure in trap.	Inter differential.	Hourly Coefficient.	Daily gas production (5-lb base, 14.4 lbs.atms. temp'ture 60/60)	Specific Gravity.
Conditions without trap	[illegible]00 lbs.	5/8"	1101 bl	---	29.9	29.3	----	----	----	------	[illegible].83
(Gas escaping in dense, white cloud.)											
36 lbs.	380 lb.	5/8"	1175 bl	[illegible]1.3	31.3	[illegible]0.9	[illegible]6 lbs.	[illegible]4.[illegible] in.	.1496	971,000 cu. ft.	0.79
(Marked decrease in whitish color of gas.)											
74 lbs.	385 lb.	5/8"	1205 bl	[illegible]1.9	31.[illegible]	[illegible]1.2	[illegible] lbs.	[illegible] 7.4 in.	.1535	947,000 cu. ft.	0.75
(Nearly all white color in gas eliminated.)											
177 lbs.	390 lb.	5/8"	1190 bl	31.7	[illegible]2.2	[illegible]1.1	177 lbs.	[illegible].9 in.	.1589	1,1[illegible],000 cu.ft.	0.70

Paine's sketch - Stack map.

E 113 - Townsend et al v. Lorraine

Filed March 23, 1922
Chas. N. Williams, Clerk

No. 3945
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
FILED
JAN 26 1923
F. D. MONCKTON.
CLERK.



Pltff's Exhibit 8-14-2

E.113 Eq. Townsend, et al - v. Lorraine

Filed March 22, 1922

Chas. M. Williams
Clk.

(1) 8-1

(2) 8-2

NO.
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
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CLERK.

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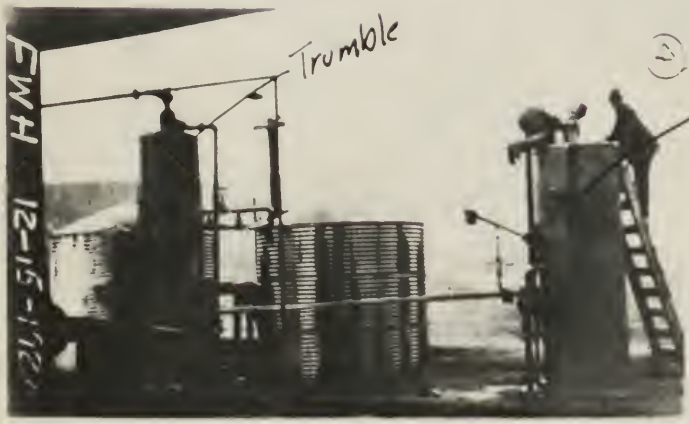
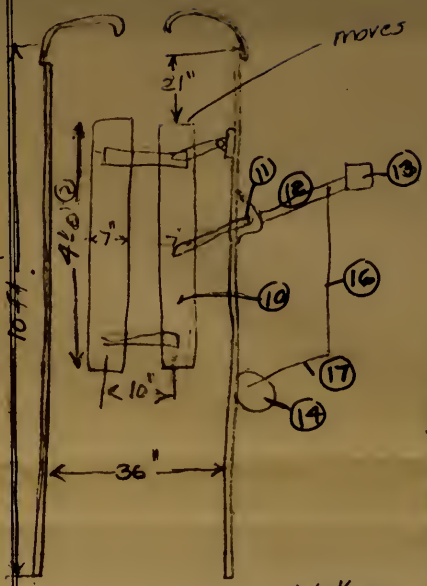


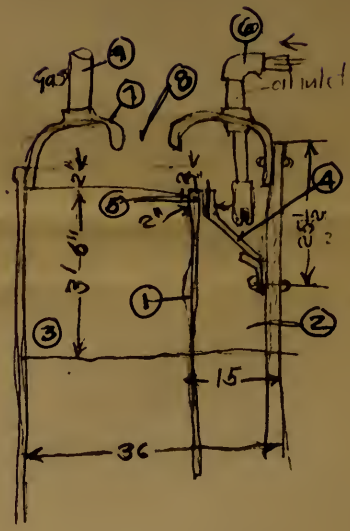
Pltff's Ex 8-1 E

E. 113 Ex.

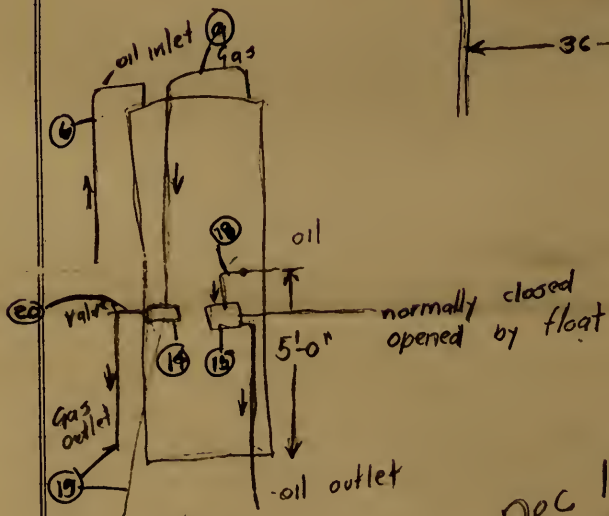
Townsend, et al
v.
Lorraine

Filed Mch. 22/22
Chas. N. Williams
Clerk





Working oil level



Dec 16, 1920
Tonner Lease,

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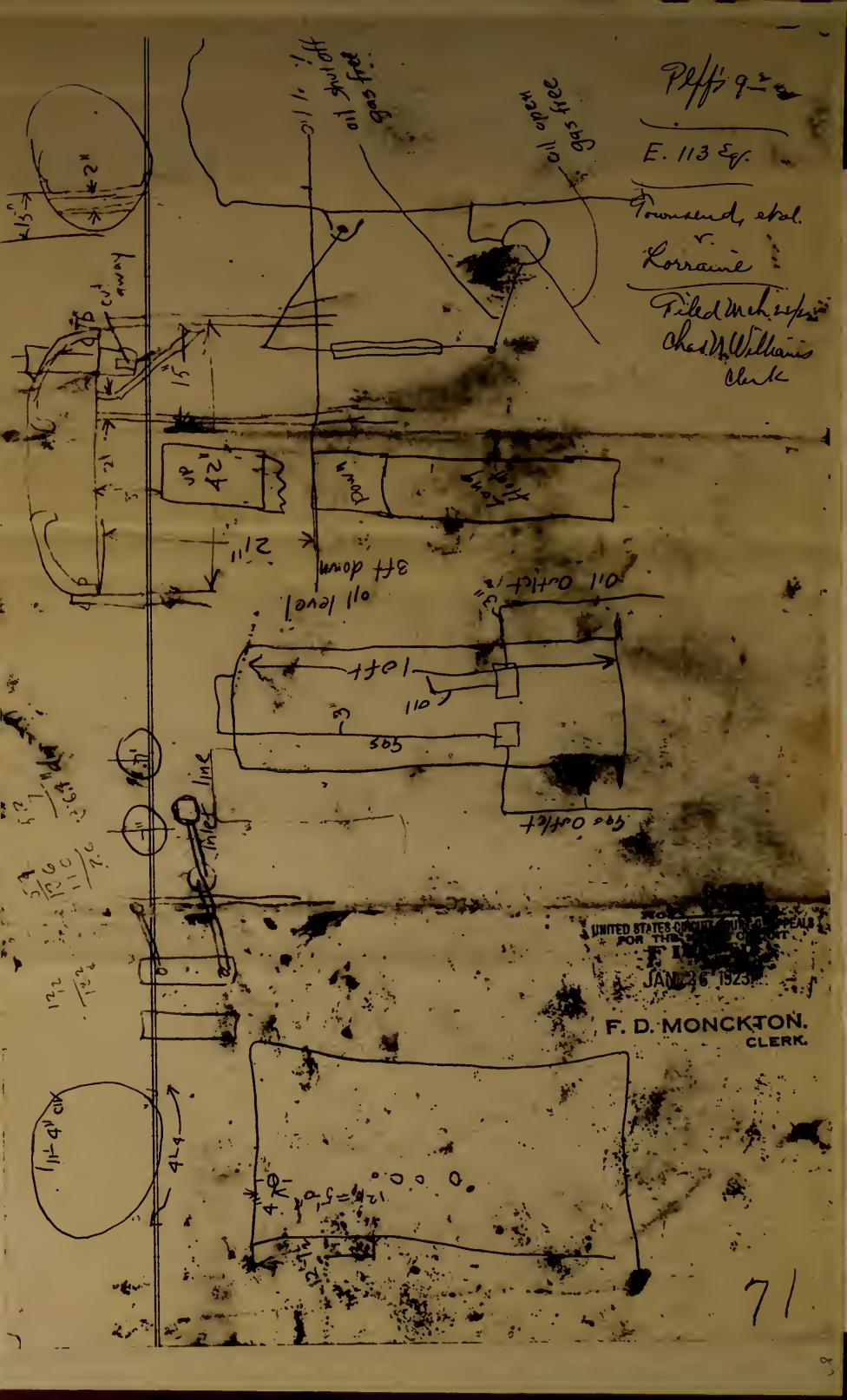
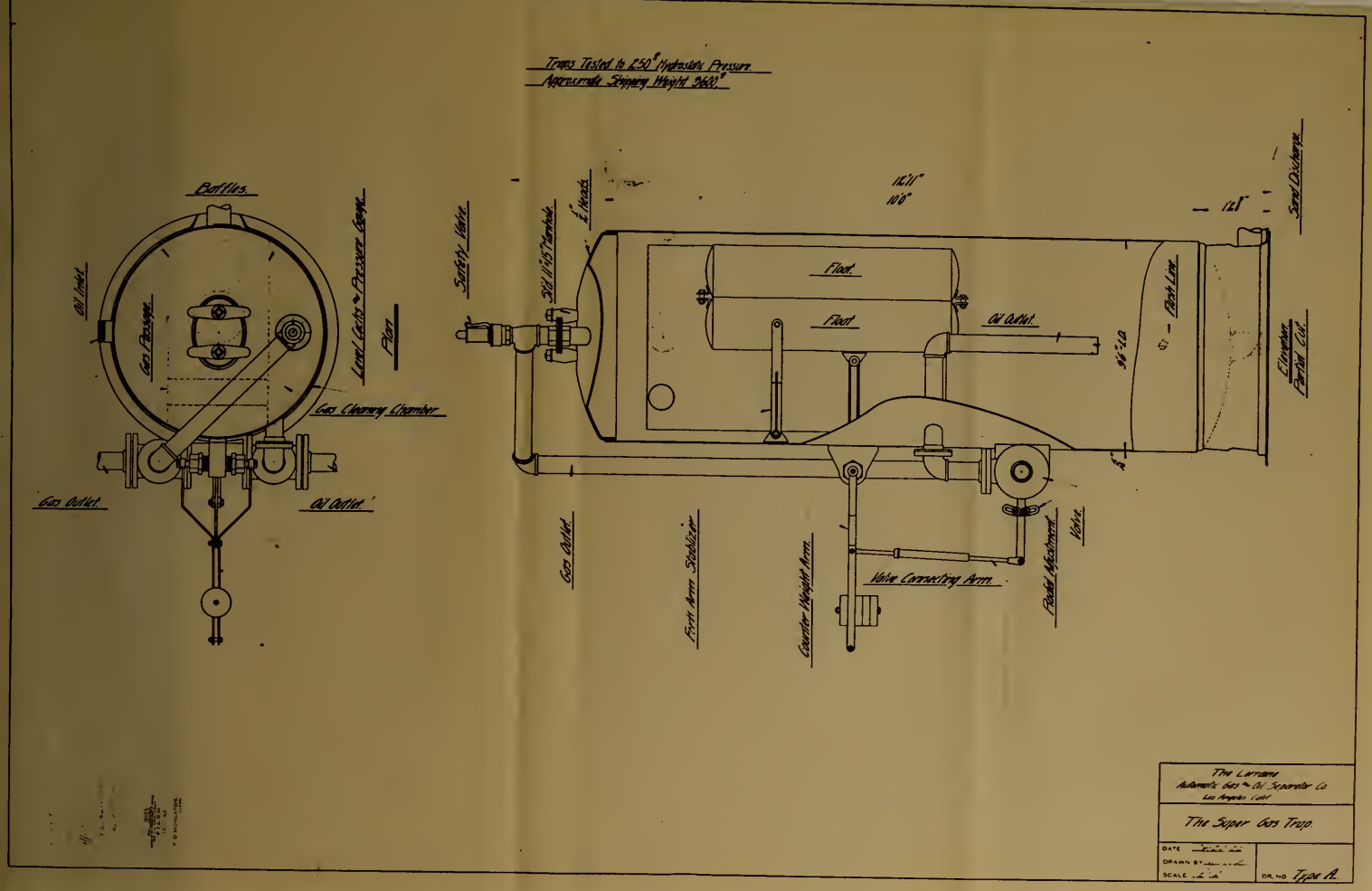
No. 8000
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
FILED
JAN 26 1923
F. D. MONCKTON,
CLERK.


Pltff's Ex.
E. 113 Ex.
Townsend, et al.
v.
Lorraine
Filed Mch 25 1925
Chas. W. Williams
Clerk
gas fire
oil shut off
oil open
gas fire
cut away
up
down
long
oil level
oil outlet
gas
oil
gas outlet
line
NOTED
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
FILED
JAN 26 1925
F. D. MONCKTON.
CLERK.
71


Traps Tested to 250# Hydrostatic Pressure
Approximate Shipping Weight 2600#
Baffles
Oil Inlet
Gas Passage
Level Gauge & Pressure Gauge
Plan
Gas Cleaning Chamber
Gas Outlet
Oil Outlet
Safety Valve
3/4" 11.5 Thread
End Heads
Float
Float
Oil Outlet
12'11"
10'0"
12'1"
Sand Discharge
Flash Line
Elevation
Partial Cut
Gas Outlet
Front Arm Stabilizer
Counter Weight Arm
Valve Connecting Arm
Float Mechanism
Valve
The Lorraine
Automatic Gas & Oil Separator Co.
Los Angeles Cal.
The Super Gas Trap.
DATE
DRAWN BY
SCALE
DR. NO. Type A.

Plaintiff's Exhibit No. 13.

Main 196
132–50

LORRAINE GAS AND OIL SEPARATOR CO.

601 Washington, Building.

Los Angeles.

March 17, 1922

Sold to—General Petroleum Corp.,
Higgins Bldg.,
City.

Your Order Number. 23282.
Our Invoice No. 80.
Terms Net 30 Days

Interest at the Rate of 8 Per Cent Per Annum Will be Charged on All Overdue Accounts.

1. Lorraine Gas and Oil Automatic Separator	1,300.00
Less 7½%....	97.50
	1202.50

Date Mar. 21, 1922—Received. [72]

[Endorsed]: E–133—Eq. Townsend et al. vs. Lorraine. Plffs. Ex. 13. Filed Mch. 23, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Plaintiff's Exhibit No. 14.

TRUMBLE GAS TRAP CO.

916 Higgins Building,

Los Angeles, Cal.

December 10, 1920.

PERSONAL.

Mr. Wm. Lacy, President,
Lacy Manufacturing Company,
Suite 601 Washington, Bldg.,
Los Angeles, Calif.

My dear Mr. Lacy:

The Co-Partnership doing business under the name of the Trumble Gas Trap Company is composed of Milon J. Trumble, the inventor of the Trumble Refining Apparatus with which you are undoubtedly fully familiar, A. J. Gutzler and myself, F. M. Townsend. Mr. Gutzler and myself have been associated with Mr. Trumble since 1910 in the development and introduction of the Trumble Refining Patents. An incidental invention of Mr. Trumble's is what is known as CRUDE PETROLEUM AND NATURAL GAS SEPARATORS, for which Letters Patent of the United States was issued on the 11th day of June, 1918, to Milon J. Trumble, Francis M. Townsend and Alfred J. Gutzler, and numbered 1,269,134.

Mr. Gutzler and myself have devoted all of our time to the Trumble matters ever since our first association with Mr. Trumble in 1910, and I believe that you will concede that the general re-

sults attained by the Trumble inventions have redounded to the great benefit of Los Angeles manufacturers, as an enormous amount of evaporators, condensers, separators and other appliances employed in the erection of Trumble Refineries have been made both in the shops of the Lacy Manufacturing Company as well as in several of the other shops doing a similiar character of work. I am aware that the amount of business which has been gathered by the Lacy Manufacturing Company from this special branch of industry has amounted to a very large sum. Furthermore, I desire to state that through the influence of the Trumble Refining people, over ninety per cent of the work connected with the manufacturing of Trumble Refining Apparatus has come to the city of Los Anggeles. Much of the materials so manufactured here have been shipped to England, Curacao, Egypt, and Mexico. All of this work is directly traceable to the efforts of Mr. Trumble and his associates.

I desire to call your attention to these facts and to emphasize that if Mr. Trumble has never conceived of his improvements of inventions in oil treating and other devices for handling oils, the manufacturers of Los Angeles would not have had the benefit of the extensive manufacturing with which they have been provided. In other words, I consider, and I believe that you will also agree, that Mr. Trumble has, without doubt, occasioned an enormous benefit to manufacturers in Los Angeles who are equipped for producing sheet metal work and that it is a matter of congratulation that such

brains are enabled to place the merits of their inventions before the public so that the public in general can benefit thereby. I believe that an inspection of your books of account will show you that the Lacy Manufacturing Company have been greatly benefited through the manufacturing of Trumble

2.

Mr. Wm. Lacy, President,
Lacy Manufacturing Company,
Suite 601 Washington Bldg.,
Los Angeles, Calif.
December 10, 1920.

Refining devices.

The occasion of my addressing you in the manner above is, that it has lately come to my attention that one, a Mr. Lorraine, has commenced the manufacturing of a so-called Automatic Oil and Gas Separator in your shop in this city and is offering the same in competition with the Trumble Gas Trap which we have introduced to oil producers at great cost and time. Mr. Trumble was the pioneer in conserving the great loss occurred through the waste of natural gas from crude petroleum, and was the first to produce a gas trap which would conserve the light volatile oils and retain them in the crude petroleum while permitting the natural gas to escape comparatively free and dry of liquid hydrocarbons. The patent above mentioned granted to Mr. Trumble and his associates, covers generic features which seem to be absolutely necessary in the construction

of a trap that will do work anywhere within the range of practicability.

The trap constructed by Mr. Lorraine in your shops embodies these patented features and is considered by us to be a flagrant and willful infringement upon the rights conferred by the said patent. I am presuming that your attention has never been called to this matter and that you believe you have a full right to manufacture this Lorraine trap, and therefore, I am hereby informing you of the condition of affairs in regard to our rights to the inventions which we claim are infringed by Mr. Lorraine and your company as well as directing your attention to the matter of the threatened interference with the personal business of Mr. Trumble and his associates in the manufacture and sale of a device which fills a want in a field which was unsatisfied prior to the time that Mr. Trumble entered the same and saved to the oil producers a vast sum which otherwise might have been wasted had he not given them the benefit of his inventive skill.

Mr. Lorraine has not originated any new principle in the separation of natural gas from the crude petroleum, but has copied essential features of the Trumble Patent. All of this is covered up under the guise of his having produced a valve for controlling the outlet of oils from the trap, and to which he attributes the great success of his device. This I assert is not true, but on the other hand the degree of success which he does have through his trap is occasioned through the use of the patented features of the Trumble Gas Trap as the particular

form of valve outlet for the outflowing oils has no bearing whatsoever upon the means internally arranged for causing the complete separation of gas and oil.

From the many years of acquaintance with your firm, and a somewhat intimate knowledge of your character and business conduct, I believe that you will agree with me that business people engaged in manufacturing enterprises, especially in the city of Los Angeles, will have no disposition to encroach upon one anothers' enterprises even in what might be considered business competition where such encroachment would work to the harm or annoyance of a person like Mr. Trumble who has benefited the manufacturers to the degree that Mr. Trumble has conferred benefits upon manufacturers of

3.

Mr. Wm. Lacy, President,
Lacy Manufacturing Company,
Suite 601 Washington Bldg.,
Los Angeles, Calif.
December 10, 1920.

your class.

I desire to express myself to you personally in this manner so that you will understand my feelings before you have been served with the formal notice of our attorneys that suit would be brought against the Lacy Manufacturing Company in its part in participation of the infringement of the Trumble Patent through its manufacturing of the Lorraine device, as such formal notice will be served upon

you in due time within the next few days. We have instructed our attorneys to proceed with the filing of suit for infringement, forthwith, but I wish you to understand that it is without personal feeling by Mr. Trumble or his associates as against the Lacy Manufacturing Company, but is forced upon us through necessity as it has lately come to our hearing that your company is now starting upon the filling of an order for a large number of the Lorraine traps.

I trust that you will receive and consider this matter in the spirit in which it is tendered, and trust that in the future our relations may remain as cordial as in the past.

Yours very truly,
F. M. TOWNSEND.

FMT: ET

[Endorsed]: E.—113—Eq. Townsend et al. vs. Lorraine. Plffs. Exhibit 14. Filed March 23, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Plaintiff's Exhibit No. 15.

LACY MANUFACTURING CO.

Plate and Sheet Steel Workers.

Steel Oil Storage Tanks and Riveted Steel Pipe.

Office 601 Washington Building.

Third and Spring Streets.

Phones
Main 196
Home A 3250.

WORKS: Cor. N. Main & Date Streets, Los Angeles, Cal.

All Agreements Are Contingent Upon Strikes, Accidents, Delays of Carriers, and Other Delays Unavoidable or Beyond Our Control. Quotations Subject to Change Without Notice.

Los Angeles, Dec. 13, 1920.

Mr. F. M. Townsend,
Trumble Gas Trap Co.,
916 Higgins Bldg.,
Los Angeles, Cal.

Dear Mr. Townsend:

I am in receipt of yours of the 10th inst., calling my atention to your claim that the oil and gas separator that Mr. Lorraine is selling is an infringement on the Trumble patent, and expressing your opinion that the Lacy Manufacturing Co. does not desire to in any way do an injustice to Mr. Trumble and his associates by being a party to placing on the market any article that would be an infringement upon Mr. Trumble's rights. In reply beg to

state that you are right in assuming that we would not care to manufacture any article that we were not legally entitled to, or that the party for whom we were making the article did not have a perfect right to sell. We have made a few of these so-called gas separators for Mr. Lorraine, upon his order and one has been delivered to him, but now since you have called our attention to your claim of infringement on the Trumble patent we would cease making them and call the attention of Mr. Lorraine to your claims and inform him that we shall cease manufacturing any more of these separators until he produces the proper evidence to show that he is not infringing on your patent right.

The writer fully agrees with you in your expressions relative to the advantage to the shops of Los Angeles that the Trumble refining patents have been. We, as well as the other shops in our line, have received many large orders for the construction of Trumble apparatus, which we realize would not have materialized, had not Mr. Trumble devoted his inventive ability to this line.

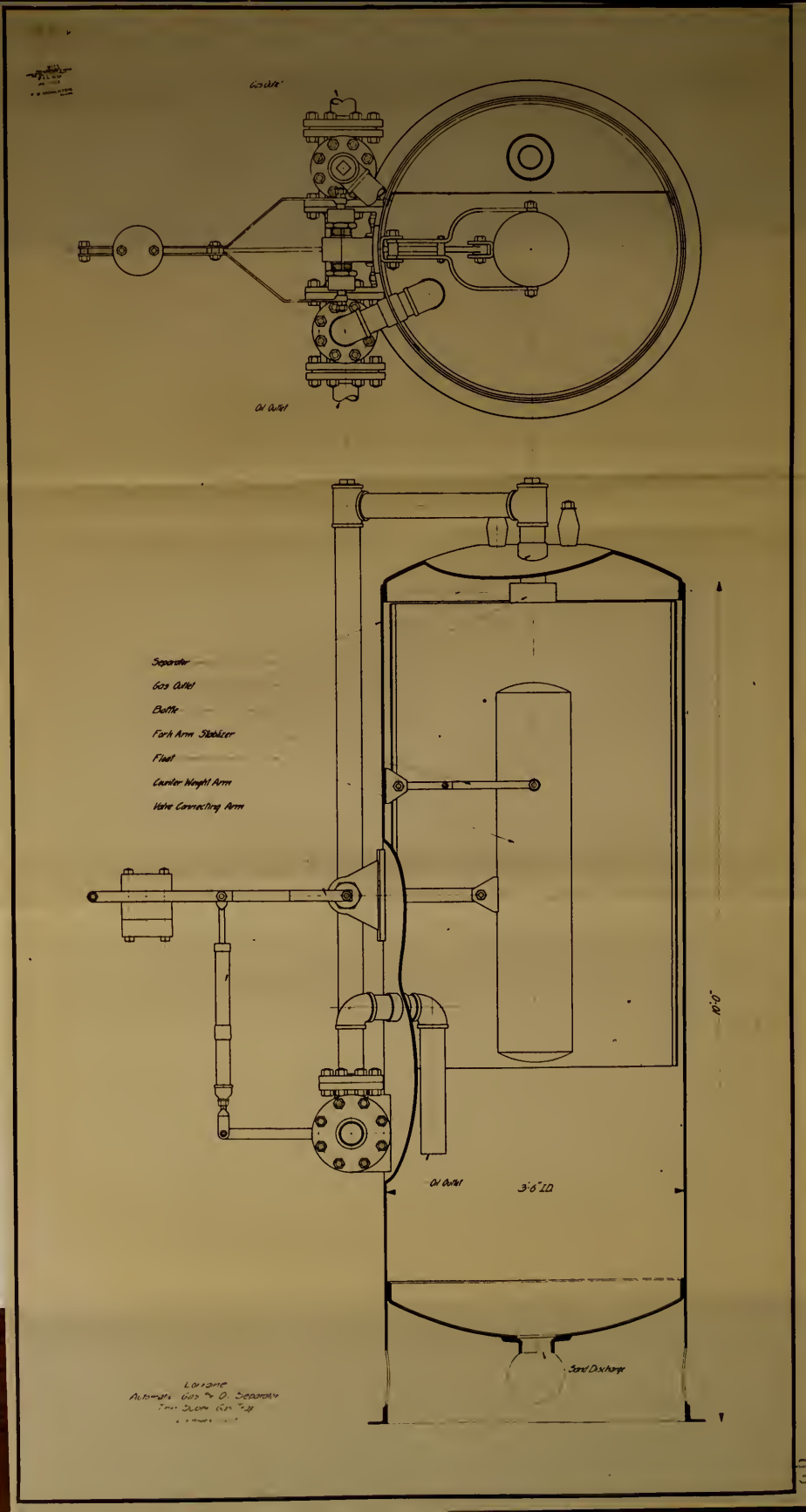
Yours very truly,

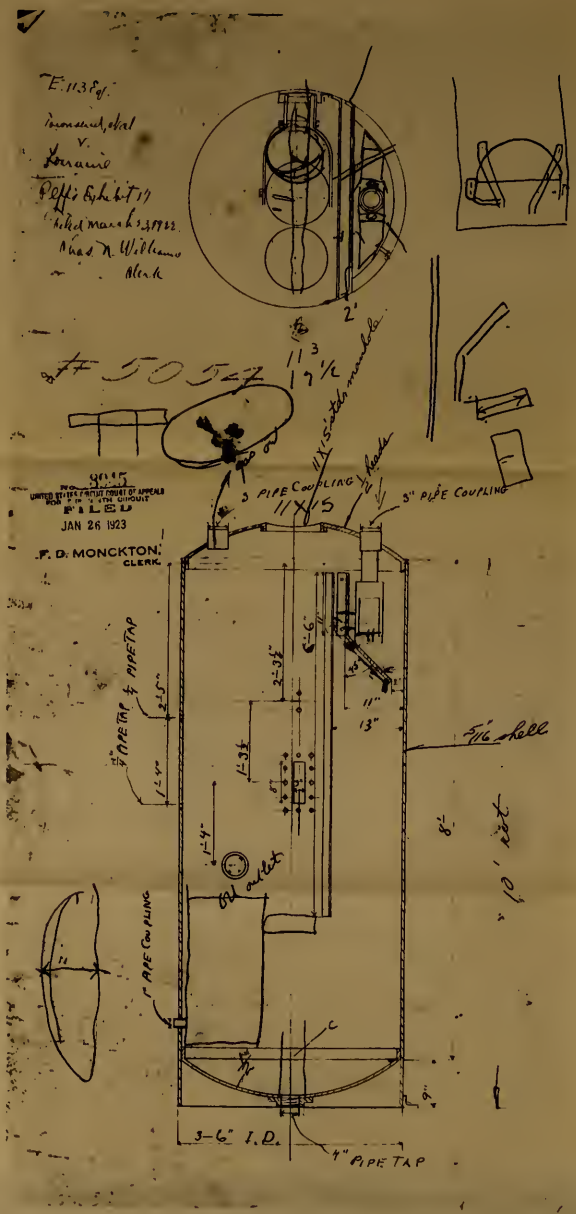
WM. LACY.

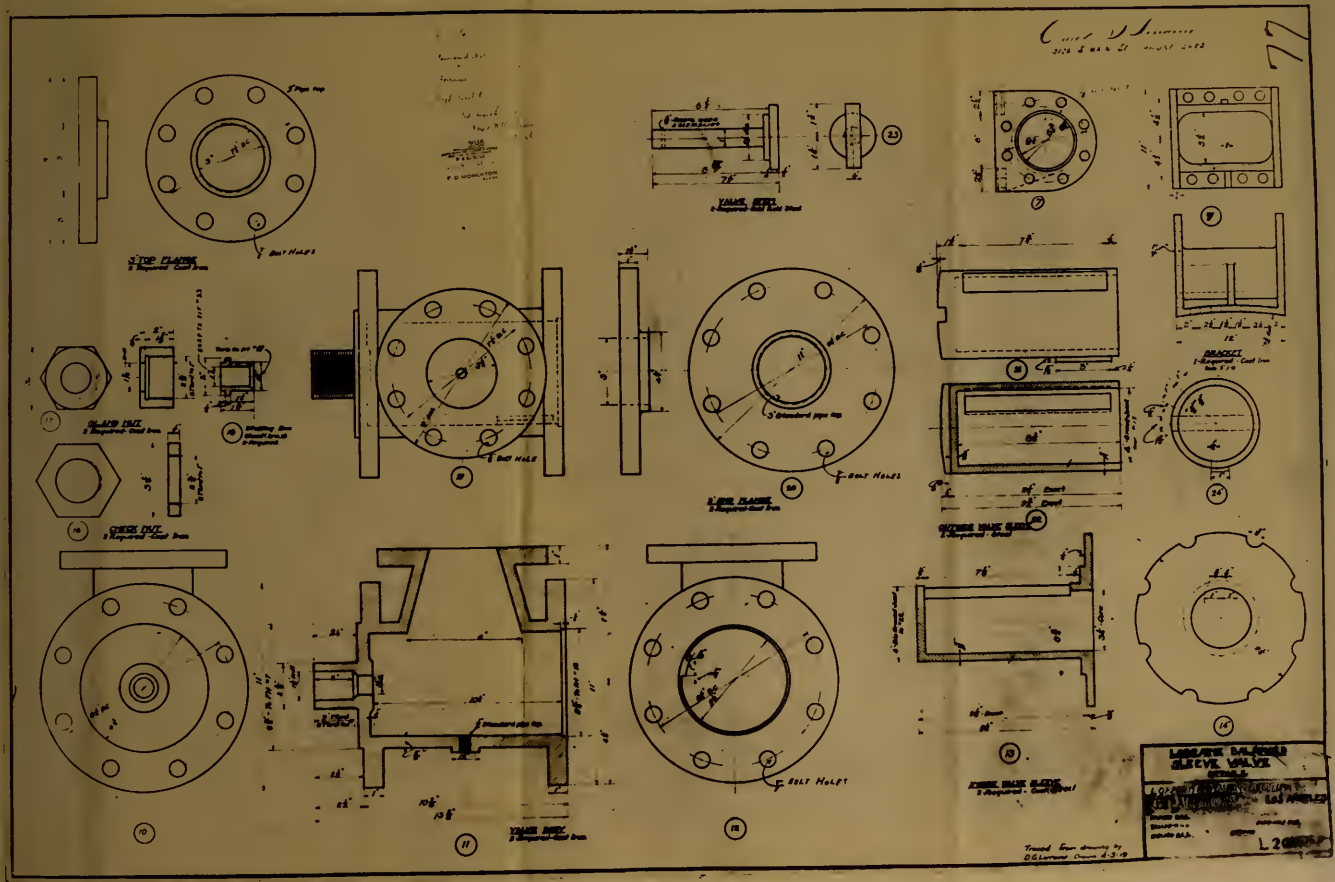
WL:HH.

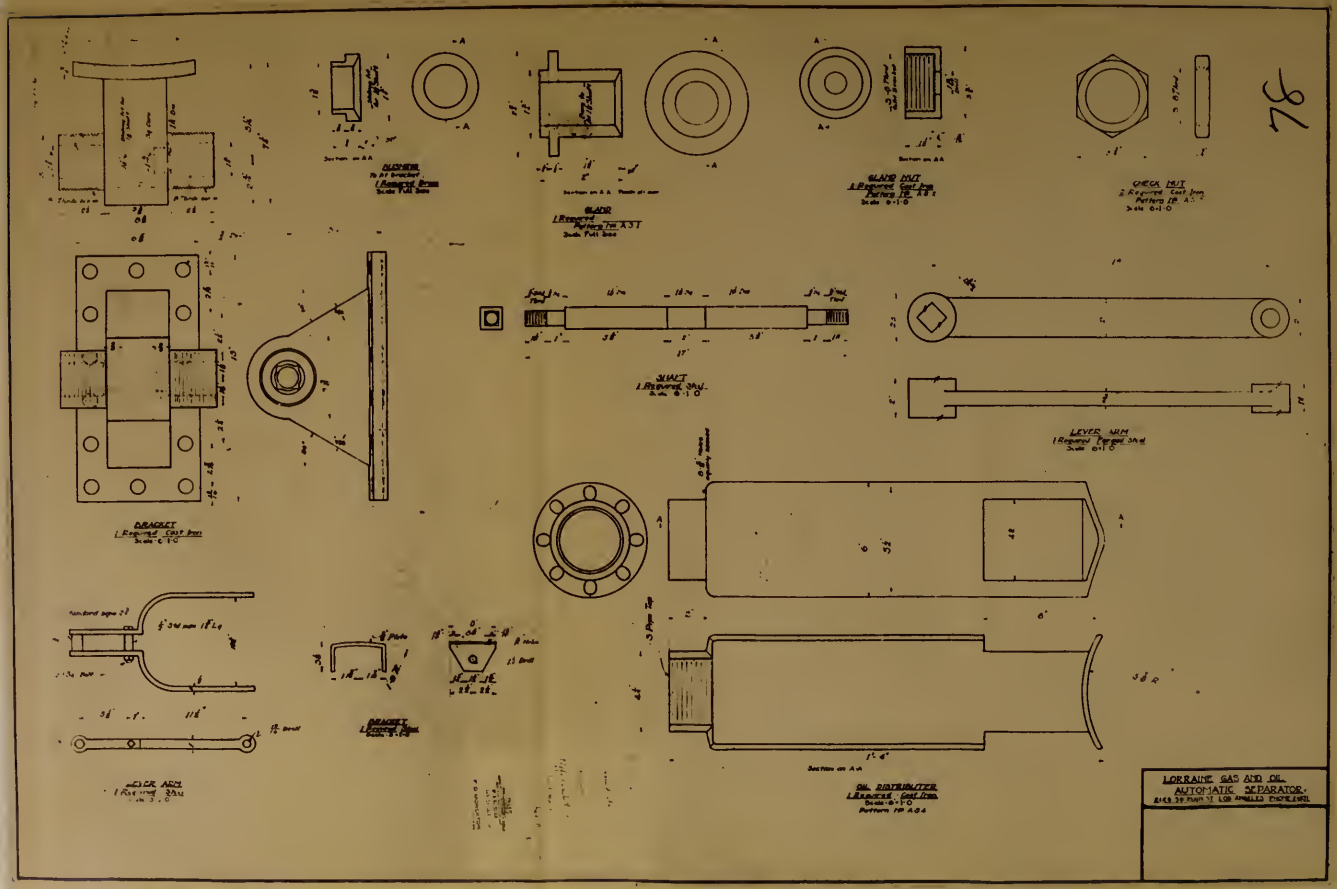
[Endorsed]: E–113–Eq. Townsend et al. vs. Lorraine. Plffs. Ex. 15. Filed March 23, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

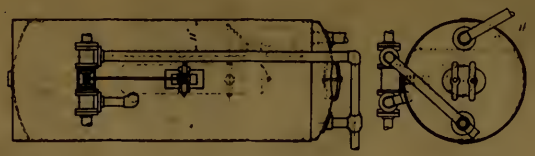

Gas Vent
Oil Outlet
Separator
Gas Outlet
Baffle
Fork Arm Stabilizer
Float
Counter Weight Arm
Valve Connecting Arm
Oil Outlet
3'6" I.D.
Sand Discharge


E. 1138 f.
Commonwealth
v.
Lorraine
Defi's Exhibit 17
Filed March 23, 1922.
Chas. N. Williams
Clerk
#50542
3 PIPE COUPLING
11X15
3" PIPE COUPLING
FILED
JAN 26 1923
F. D. MONCKTON,
CLERK
7" PIPE TAP
2'-5"
1'-4"
2'-3½"
1'-3½"
6'-6"
11"
13"
5/16" shell
8'-
10' dia.
oil outlet
1" PIPE COUPLING
3'-6" I.D.
4" PIPE TAP
2'
17½"
11X15 satin nickel
black

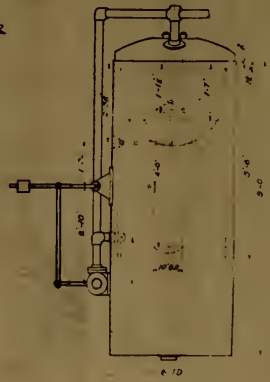

77
STOP FLANGE
BOLT HOLES
VALVE SEAT
BRACKET
GLAND NUT
CHECK NUT
BOLT HOLES
BOLT HOLES
VALVE SEAT
BOLT HOLES
LARGE VALVE SLEEVE
L 2

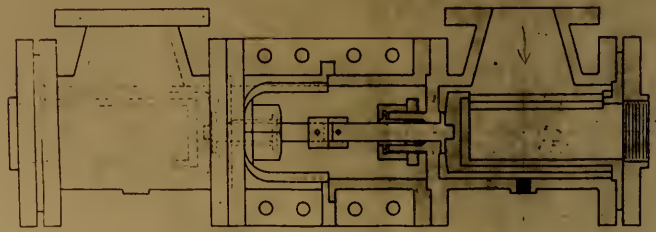

76
BLOWER
BLADE
1 Required
Pattern No. A37
Scale Full Size
GLAND NUT
1 Required Cast Iron
Pattern No. A38
Scale 0-1-0
CHECK NUT
2 Required Cast Iron
Pattern No. A39
Scale 0-1-0
BRACKET
1 Required Cast Iron
Scale 0-1-0
SHAFT
1 Required Steel
Scale 0-1-0
LEVER ARM
1 Required Forged Steel
Scale 0-1-0
CLICK ARM
1 Required Steel
BRACKET
1 Required Steel
OIL DISTRIBUTOR
1 Required Cast Iron
Scale 0-1-0
Pattern No. A36
LORRAINE GAS AND OIL
AUTOMATIC SEPARATOR
DES. BY FRANK W. LOS ANGELES CALIFORNIA

79



SKETCH
OF
AUTOMATIC SEPARATOR





VALVE ASSEMBLY

LORAINE GAS AND OIL
AUTOMATIC SEPARATOR

Plaintiff's Exhibit No. 20.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

David G. Lorraine vs.

E 113 Eq. — Thomas et al — v. Lorraine

 Filed March 27, 1922

Chas. N. Wellman clerk

Huntington Beach in California Is Yet a "Blind" Oil Field

LOS ANGELES, CALIF., Feb. 20.—Because of the lack of uniform methods of development, and because the work at the majority of the independent wells is too independent of operations at neighboring wells, few definite facts have been established as to the subsurface conditions in the Huntington Beach field, according to J. B. Case, in the Summary of Operations, California Oil Fields, for November, just published.

Mr. Case devotes considerable space to pointing out the difficulty of assembling accurate information on the subsurface conditions of the field, and his conclusions epitomize his lengthy article as follows:

From the above summary of operations in the Huntington Beach oil field it will be noted that very few definite facts have been established as to subsurface conditions. The lateral extent of the first oil zone, or individual sands within it, is not known. The position of intermediate water has not been located except in two wells. The top of the second oil zone has not been determined.

The investigation discloses that the principal contributing causes for the lack of information may be summed up as follows:

1. The use of the rotary method of drilling with its attendant detrimental factors—use of heavy mud and speed of drilling.

2. The unusual number of wells drilling simultaneously over a small acreage.

3. Failure of operating concerns to take time to make definite tests when the opportunity presented itself to do so.

4. The large number of poorly financed concerns, operating on town-lot leases, whose aim to produce oil in paying quantities is of secondary importance.

5. Cementing of water strings deeper than proposed by operators and approved by the department.

6. Cementing through perforations in the strings, thereby eliminating certain formations from production tests. This work was equivalent to cementing a water string at a greater depth than agreed upon.

7. Placing of cement plugs in perforated casing between depths other than agreed upon and approved.

It would greatly facilitate the obtaining of definite data on underground conditions if have several test wells drilled for the sole purpose of obtaining information, production being a secondary consideration. The location of these wells should be carefully chosen in order to obtain the maximum amount of information. With data derived from such wells in which the information is dependable a workable plan of development could be derived at which would safeguard the interests and overcome the problems of all, without inflicting hardship on anyone.

for All California Fields for January is as Follows:

New Rigs	Wells: Drilling	Comp. During Month	Abn. During Month	Producing	Prod. Per Day
.... 4	23	3	..	2,222	18,600
.... 1	8	1	..	347	6,846
....40	84	26	2	2,699	118,024
.... 1	8	3	..	586	9,196
.... 1	13	..	2	1,182	34,264
.....	11	..	..	410	13,988
.... 1	39	3	2	533	6,657
.....	6	1	..	673	3,370
...20	129	5	1	1,113	88,391
...17	151	17	..	66	16,206
.....	..	..	..	137	148
... 2	65	..	..	9	65
...87	537	59	7	9,983	315,755

...36,184,527 bbls.
... 8,625,792 bbls.

ntific Conservation

raine Automatic Gas and Oil Separators

The Super Gas Traps

raine Gas and Oil Separators are designed on y new principles. They accomplish the separation of oil, gas and sand by methods never before employed. They actually regulate and control the flowing well, thereby increasing production. Built to handle wells of any capacity. Ask any large California operator, or for detailed information write or cable

Buck & Stoddard

90 West Street, New York
485 California Street, San Francisco
456 South Spring Street, Los Angeles
Cable Address "Buckstod"

Guiberson Corporation Has New Rotary Tool Joint To

Los Angeles, Cal., Feb. 20.—A new rotary tool joint tong has been designed and patented by the Guiberson Corporation, and will be added to the list of Guiberson specialties for field use.

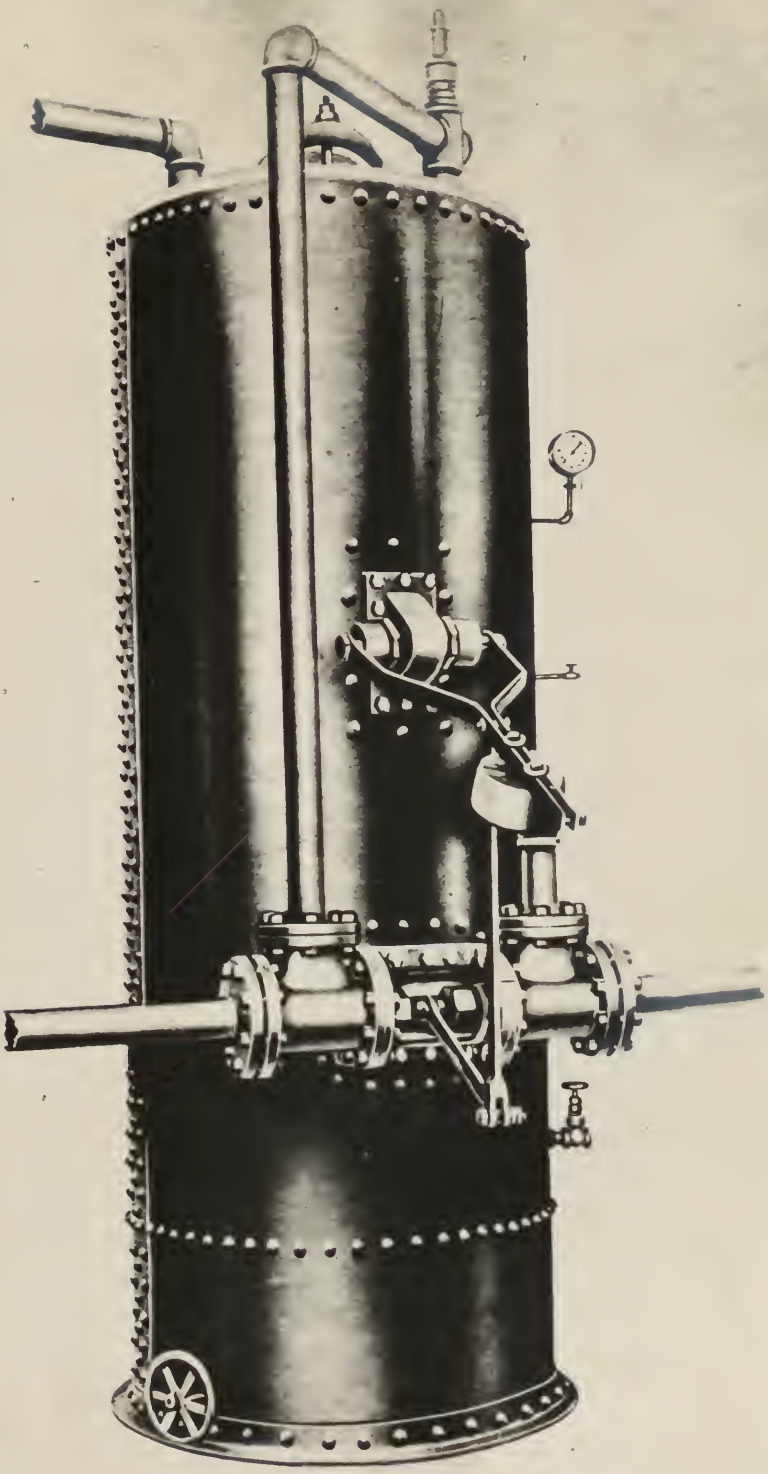
The new tong has been in use in California for sometime, as it is the purpose of the company to have it thoroughly tested, under conditions, before offering it in the various sizes for sale throughout the country.

In spite of the fact that tongs of every description are patented and marketed to the trade, the new Guiberson tong has 21 claims made for it, in its patent, claims of new and distinct features not heretofore embodied in similar device.

The tong is designed to work automatically and when pushed against the casing it works automatically and tight, the spring latch being so designed that it is impossible for it to work loose, until it is released, and at the same time it is easy to disengage by hand. The power applied to the handle forces a specially designed "kidney" against the casing wall, and gives a grasp that can't slip.

It is expected by the use of a bushing the new tong may be used as any ordinary casing tong, though the tool is specially designed for a rotary tool joint tong.

The Guiberson-Mills tong is offered by the same company, and has found a ready demand in all the fields. The new tool is not designed to take the place of the Guiberson-Mills tong but to supplement this tong.



Harris Sketch

1 Ev.

mund, et al

v.

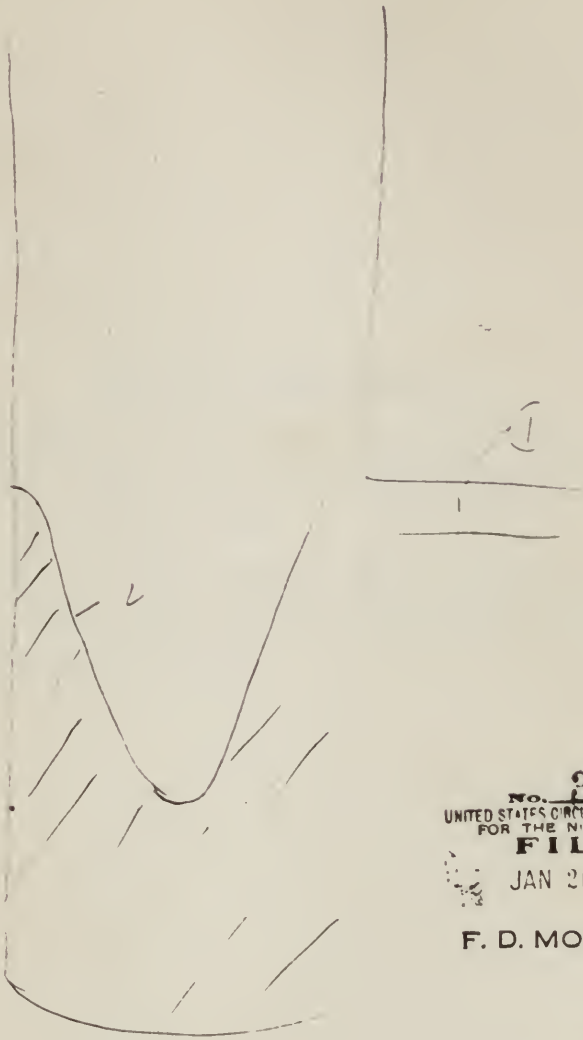
ard

b. 24

March 20/22

S. Williams

Clerk



No. 2045
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
FILED
JAN 26 1923
F. D. MONCKTON.
CLERK.

Plaintiff's Exhibit No. 25.

[Endorsed]: E–113—Eq. Townsend et al. vs. Lorraine. Plffs. Exhibit 25. Filed March 28, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

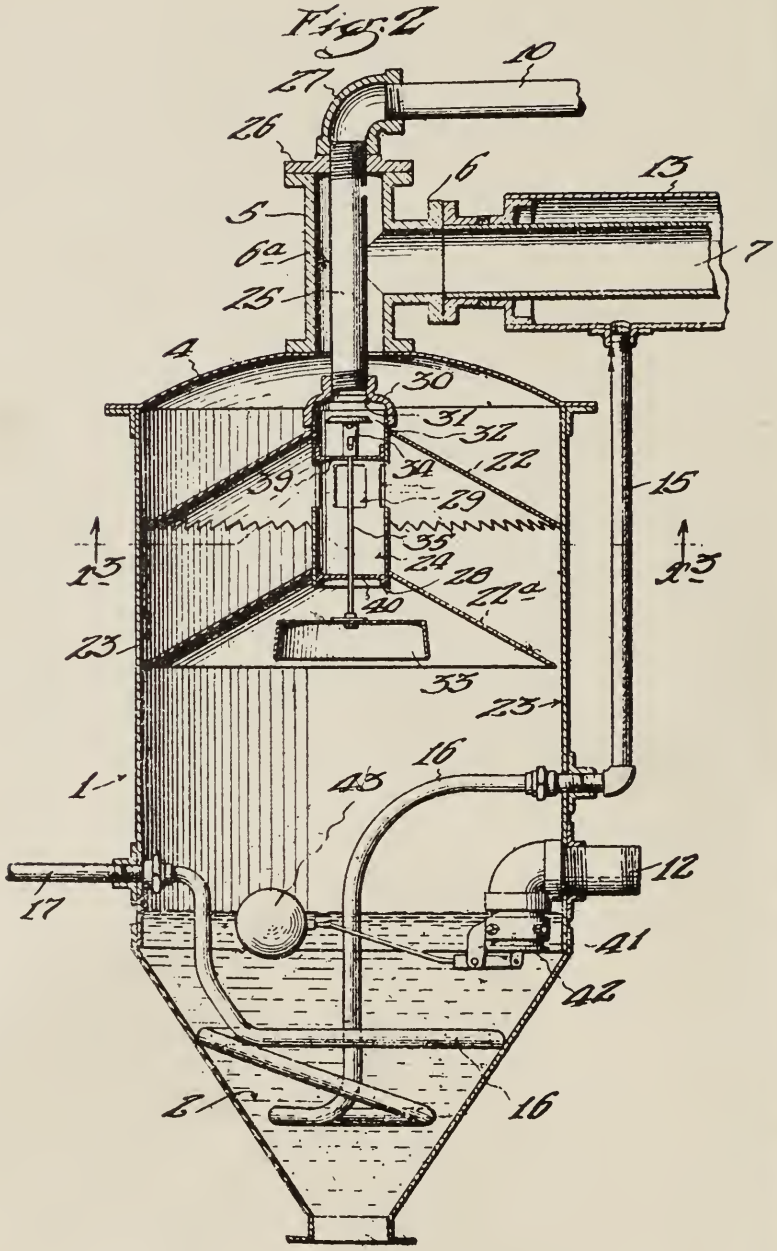


Fig. 2
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27
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6a
7
25
4
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34
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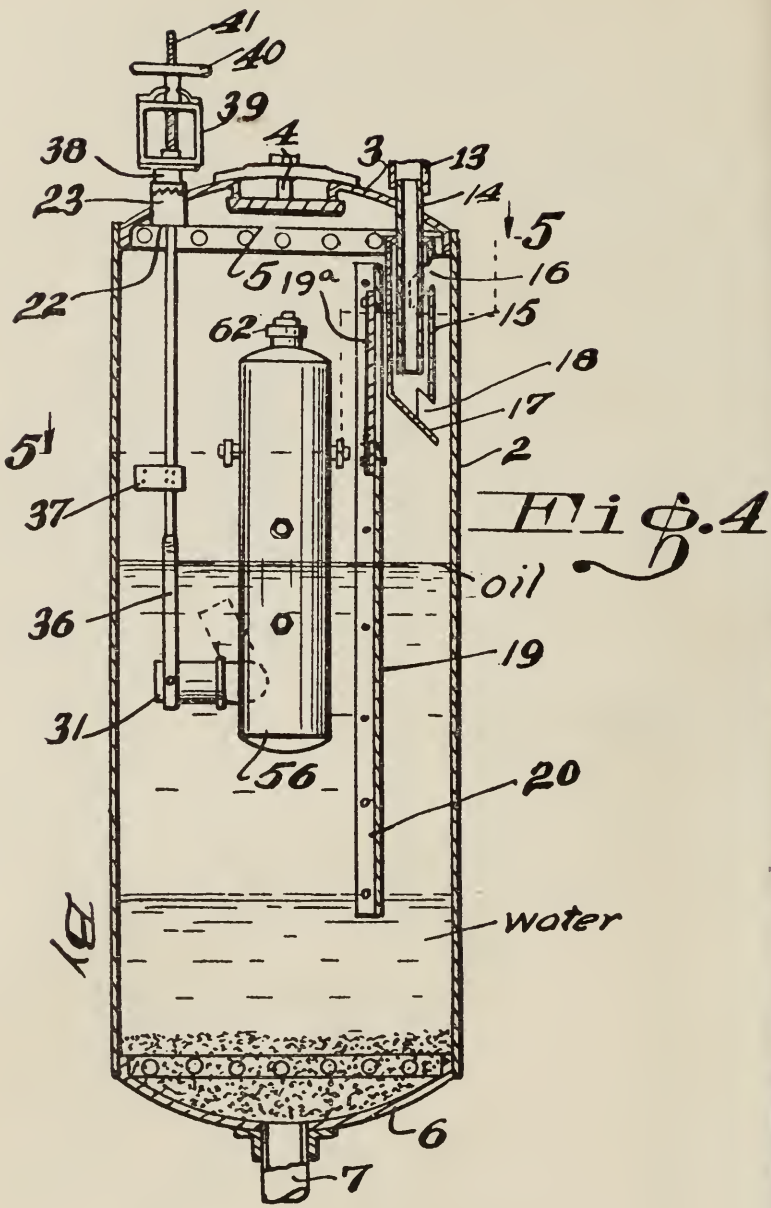
15
35
24
28
13
13
22a
40
23
33
23
16
1
45
12
17
41
42
2
16

Plaintiff's Exhibit No. 26.

[Endorsed]: E-113—Eq. Townsend et al. vs. Lorraine. Plffs. Exhibit 26. Filed March 28, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.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38
23
22
4
3
13
14
5
16
15
5
19a
62
18
17
2
5'
37
36
31
56
oil
19
20
water
6
7
10

Fig. 4

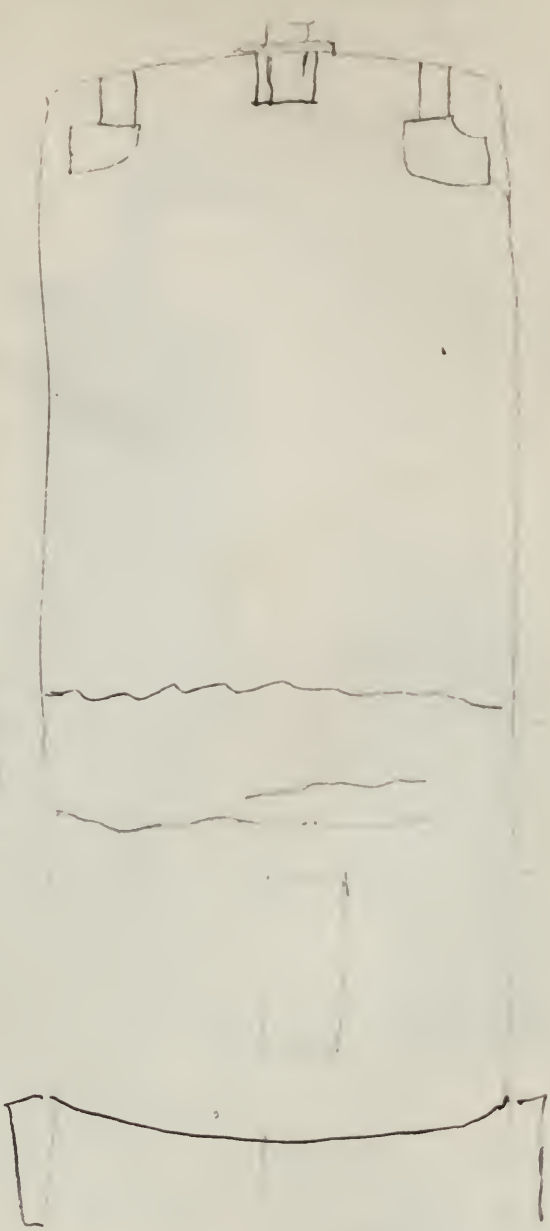
Ex B.

v.
ed, etc
r
and

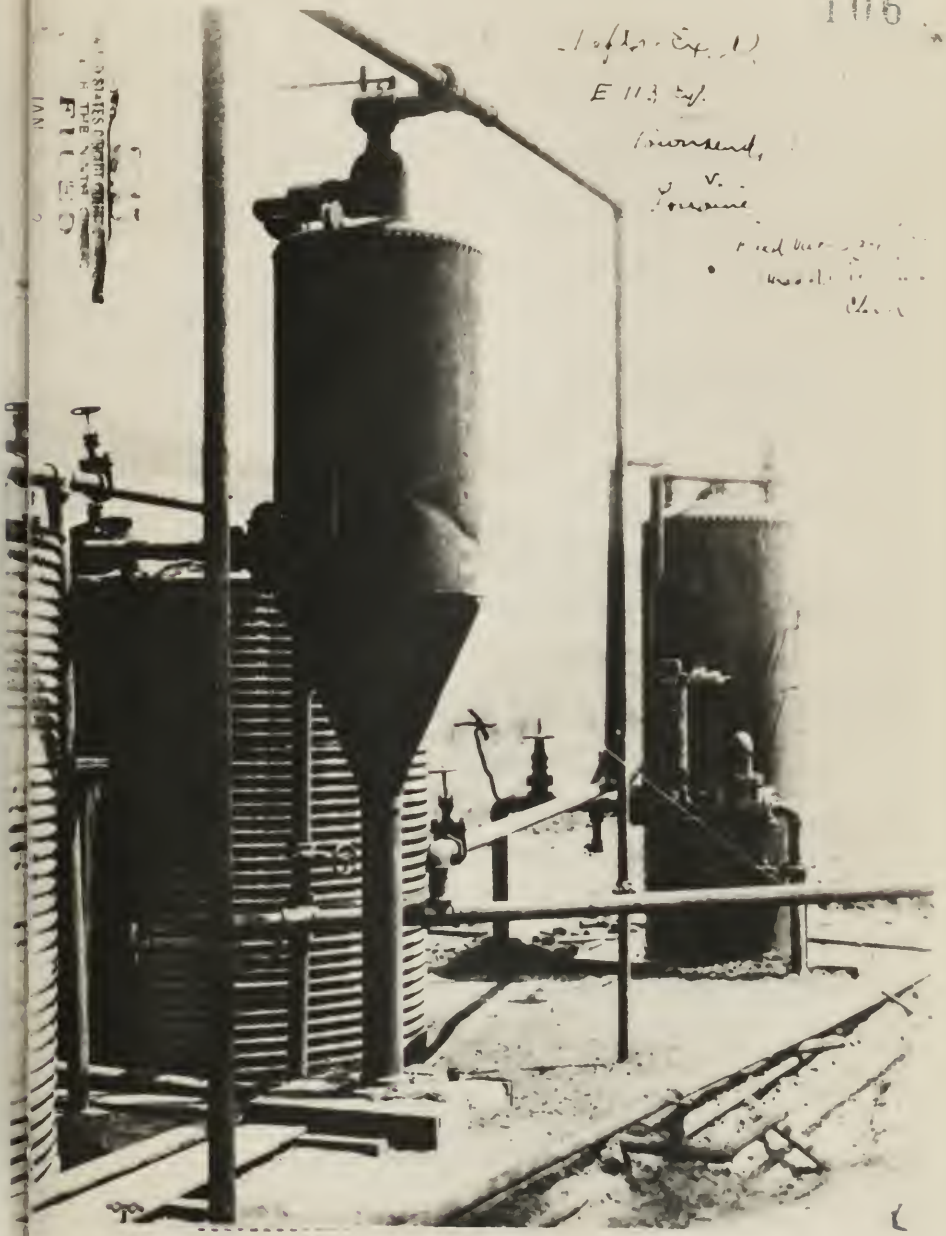
Exhibit B.

March 23, 1922
N. William
Clerk

9945
S CIRCUIT COURT OF APPEALS
HE NINTH CIRCUIT
FILED
AN 26 1923
MONCKTON.
CLERK.



83



Well #3 Tonner. General Petroluem Oil Co.

Defendants' Exhibit "E."

2—390.

UNITED STATES OF AMERICA.

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE.

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of the

Letters Patent of

George L. McIntosh, Assignor of Two-thirds to Kathryn L. Byrne and Roscoe C. Olmsted,

Number 1,055,549, Granted March 11, 1913,

for

Improvement in Mechanism for Separating Gas From Liquids.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this twenty-fourth day of March, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] M. H. COULSTON,
Commissioner of Patents.

2—362.

No. 1055549.

THE UNITED STATES OF AMERICA,

To All to Whom These presents Shall Come:

WHEREAS GEORGE L. McINTOSH, of Los Angeles, California, has presented to the Commissioner of Patents a petition praying for the grant of letters patent for an alleged new and useful improvement in mechanism for separating gas from liquids,

He having assigned two-thirds of his right, title and interest in said improvement to Kathryn L. Byrne and Roscoe C. Olmsted, both of Pasadena, California, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and he complied with the various requirements of law in such cases made and provided, and

WHEREAS upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the law.

Now therefore these Letters Patent are to grant unto the said George L. McIntosh, Kathryn L. Byrne, and Roscoe C. Olmsted, their heirs or assigns, for the term of Seventeen years from the eleventh day of March, one thousand nine hundred and thirteen, the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent

Office to be affixed at the City of Washington this eleventh day of March, in the year of our Lord one thousand nine hundred and thirteen, and of the Independence of the United States of America the one hundred and thirty-seventh.

[Seal] C. C. BILLINGS,
Acting Commissioner of Patents.

G. L. McINTOSH.

MECHANISM FOR SEPARATING GAS FROM LIQUIDS.

APPLICATION FILED JUNE 20, 1912.

1,055,549. Patented Mar. 11, 1913.

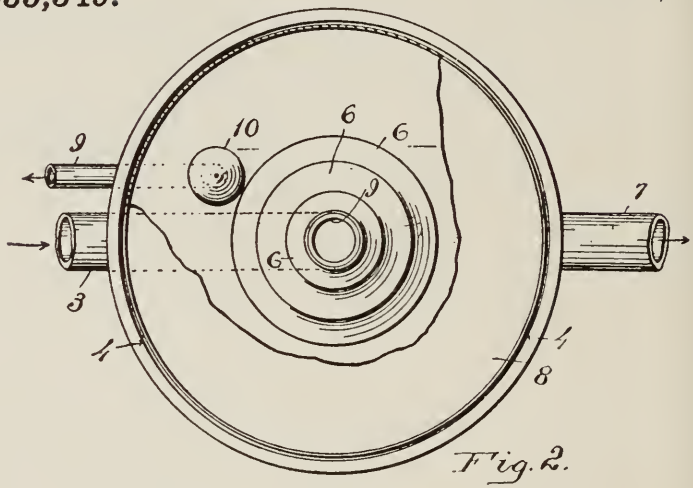


Fig. 2.

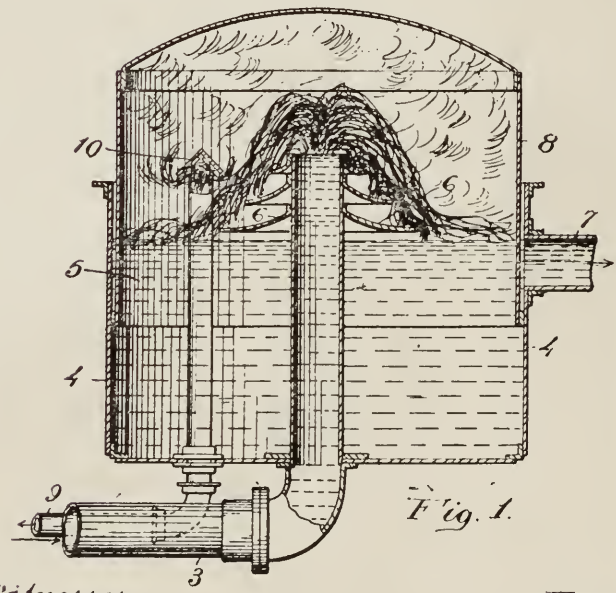


Fig. 1.

Witnesses:
H. E. Blyne.
M. Rudholm.

Inventor:
G. L. McIntosh
By
Atty

UNITED STATES PATENT OFFICE.

EORGE L. McINTOSH, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF TWO-THIRDS TO KATHRYN L. BYRNE AND ROSCOE C. OLMSTED, BOTH OF PASADENA, CALIFORNIA.

MECHANISM FOR SEPARATING GAS FROM LIQUIDS.

.055,549. Specification of Letters Patent. **Patented Mar. 11, 1913.**

Application filed June 20, 1912. Serial No. 704,770.

all whom it may concern:

Be it known that I, GEORGE L. McINTOSH, citizen of the United States, and resident Los Angeles, in the county of Los Angeles d State of California, have invented certin new and useful Improvements in Mechism for Separating Gas from Liquids, of hich the following is a specification.

My invention relates to improvements in echanism or apparatus for separating gas om liquids, and it consists of a separating evice to be used in connection with pumpig mechanism.

The object of the invention herein is to parate gas from liquids, and to collect the s into a holder and retain it for use for lating and lighting purposes, as well as to nstitute a store of said gas to be utilized r driving gas engines, or for use in other parataus where gas is employed.

In my present invention I lead the main scharge pipe from a pump into a tank of fficient capacity to hold any required quanty of water or other liquid, such, for inance, as petroleum, and also to contain a llecting chamber or receiver, as a gas lder. The receiver has a discharge pipe r the liquid, and another pipe extends up to the gas holder, from which the gas colted therein passes through into the heatg or lighting apparatus, or into the cylinr or cylinders of gas engines wherein it is ed.

The upper part of the gas discharge pipe provided with two or more flanges of thin tal, or other material, each inclined downrdly, so that the liquid as it issues from e discharge pipe passes over the upper end the discharge pipe, and flows down over ese inclined flanges of metal, dropping at e circumference of each such flange on to e next succeeding flange below. In this anner, the liquid flows in thin layers out om the discharge pipe over the succession flanges, so that it is spread over a series thin and extended layers whereby the s contained therein in the liquid is freed d collected in the gas chamber.

For the purposes of facilitating the action the pump, as well as for preventing as uch as possible of the gas, ascending with e liquid into the lift-pipe, from passing to the pump, I connect a large discharge pe for the gas, coupled at its upper end to vacuum pump. The object in this case being to provide as large an area of discharge of the gas as is possible to the vacuum pump, and the discharge from the vacuum pump is connected to the gas pipe, whereby the gas, separated from the liquid passing into the gas holder, is led from the gas holder for lighting and heating purposes, or for driving motive power engines, as will now be set forth in detail.

In the drawings, Figure 1 is a vertical section of the tank and gas holder, for separating gas from liquids. Fig. 2 is a plan, partly in section, of Fig. 1.

In the drawing 3 is the discharge pipe from the pump, which is led through the bottom of a tank 4, and to a sufficient height above the level of the liquid 5, contained therein, to enable the liquid to discharge and trickle down over the inclined flanges 6, which surround the upper end of the pipe. I have shown but three flanges, but a lesser or a greater number of such flanges may be used.

The tank 4 is provided with an overflow pipe 7 for the discharge of the liquid. Within the tank 4 is an inverted gas bell or holder 8, which is air or gas tight, the lower part of which dips to a sufficient depth into the liquid in the tank 4 to prevent leakage or outflow of gas from the bell or gas holder 8, excepting through the gas pipe 9, through which pipe the gas flows to a reservoir or chamber wherein it may be stored for lighting or heating purposes, or to a carbureter for being commingled with air for operating in the cylinders of explosive engines, or for other purposes.

The head of the gas pipe 9, within the gas holder 8, is preferably provided with a hood or shield 10.

It will be understood from the foregoing description that this invention is a separating device, located in the discharge pipe of a pump, which is lifting either water or any other liquid that contains a gas, so that the gas, separated from the liquid, may be used for any purpose for which it is adapted.

I claim:

1. In a mechanism for separating gas from liquids, a tank, a stand pipe in said tank through which liquid is forced into the tank, the stand pipe having below its upper end and supported thereon a plurality of flanges upon or over which the liquid trickles as it is discharged from the stand pipe, an over-

flow pipe, a bell or gas holder located within the tank, a pipe for allowing the escape of gas from the bell or gas holder.

2. In a mechanism for separating a gas from a liquid, a tank, a bell for said tank, a stand pipe centrally located within the bottom of tank and extending upwardly into said tank, a plurality of flanges carried by said stand pipe, said flanges being spaced apart and increasing in size and each lower one being of larger diameter than the one above, an overflow pipe entering the side of said tank, the end of said overflow pipe being flush with the side of said tank, a g draw off pipe entering the bottom of sa tank and extending above the level of t liquid.

Signed at the city of Los Angeles coun of Los Angeles State of California, this 4 day of April 1912, in the presence of w nesses.

GEORGE L. McINTOSH.

Witnesses:
EDMUND KASOLD,
J. S. ZERBE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Pate Washington, D. C."

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defendants' Exhibit "E." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "F."

2—390.

UNITED STATES OF AMERICA,
DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the

Letters Patent of

Walter Anderson Taylor,

Number 426,880, Granted April 29, 1890,

for

Improvement in Steam Separators.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this twenty-first day of March, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] M. H. COULSTON,
Commissioner of Patents.

2—152.

No. 426,880.

THE UNITED STATES OF AMERICA,

To All to Whom These Presents Shall Come:

WHEREAS Walter Anderson Taylor, New Or-

leans, Louisiana, has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in Steam Separators, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and

WHEREAS, upon due examination made, the said claimant is adjudged to be justly entitled to a patent under the law;

Now, therefore, these Letters Patent are to grant unto the said Walter Anderson Taylor, his heirs or assigns, for the term of seventeen years from the twenty-ninth day of April, one thousand eight hundred and ninety, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the Seal of the Patent Office to be affixed, at the City of Washington, this twenty-ninth day of April, in the year of our Lord one thousand eight hundred and ninety, and of the Independence of the United States of America the one hundred and fourteenth.

[Seal] CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

ROBERT J. FISHER,
Acting Commissioner of Patents.

(No Model.) 2 Sheets—Sheet 1.

W. A. TAYLOR.

STEAM SEPARATOR.

No. 426,880. Patented Apr. 29, 1890.

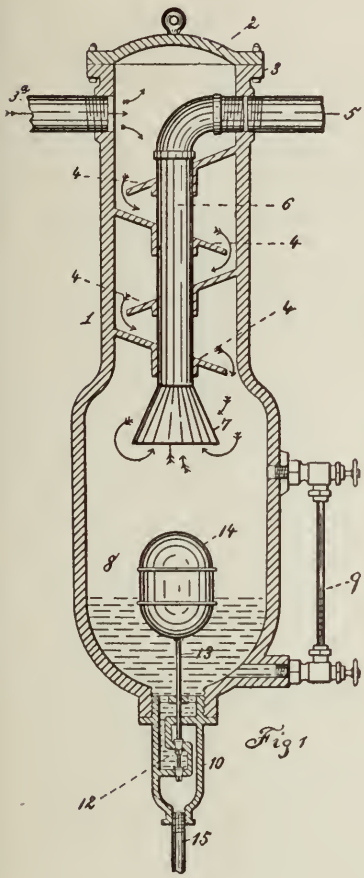


Fig 1

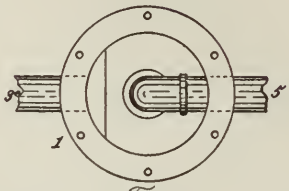


Fig 2

Fig 3

WITNESSES:

Robert Ries.

Wm. F. Carey

INVENTOR

Walter Anderson Taylor.

By Frederic Cook

Attorney

(No Model.) 2 Sheets—Sheet 2.

W. A. TAYLOR.

STEAM SEPARATOR.

No. 426,880. Patented Apr. 29, 1890.

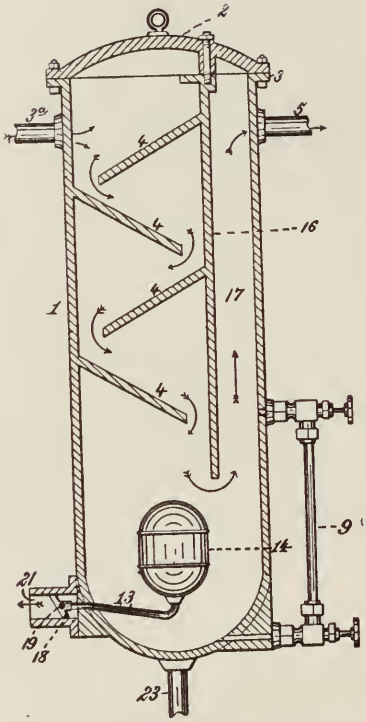


Fig 4

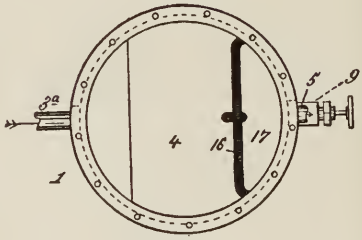


Fig 6.

WITNESSES

Charles De la Croix

Sam B Robeson

INVENTOR

Walter Anderson Taylor

BY Frederic Cook,

Attorney.

UNITED STATES PATENT OFFICE.

WALTER ANDERSON TAYLOR, OF NEW ORLEANS, LOUISIANA.

STEAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 426,880, dated April 29, 1890.

Application filed November 13, 1889. Serial No. 330,148. (No model.)

all whom it may concern:

Be it known that I, WALTER ANDERSON TAYLOR, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Steam-Separators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the figures of reference marked thereon.

The object of my invention is to provide a novel apparatus for separating the water of condensation from live steam and eliminating therefrom the particles of grease, oil, or other impurities taken up by the steam in passing from the boiler to the steam-chests of the cylinders. To accomplish this object my invention involves the peculiar features of construction and the combination or arrangement of devices hereinafter described, and specifically set forth in the claims, reference being made to the accompanying drawings, in which—

Figure 1 is a central vertical section of a trap embodying my invention. Fig. 2 is a plan view of the same with the cap or cover removed. Fig. 3 is a top view of the valve-chamber. Fig. 4 is a vertical central section showing a modified construction. Fig. 5 is a plan view of Fig. 4, the cover being removed.

In the said drawings the reference-numeral 1 denotes a drum or vessel, preferably of cylindrical form, and of small diameter compared with its considerable depth. This drum is closed at its top by a cover 2, bolted to a flange 3, the joint being steam-tight.

The numeral 3^a denotes the steam-pipe, which enters the drum at or near the top. Formed or mounted upon the interior face of the drum are baffle-plates 4, having preferably a downward inclination, and projecting from opposite walls of the drum alternately, their edges approaching the wall opposite to that on which they are mounted, but not meeting, in order that narrow passages may be left for the steam. Any required number of these baffle-plates may be used.

Entering the upper part of the drum above the baffle plates 4 is a pipe 5, which communicates with a conveyer-tube 6, passing through or by the several plates 4 until its flaring or expanded mouth 7 drops somewhat below the lower plate. The pipe 5 leads to the steam-chest or other point to which the live steam is to be conveyed.

In the lower portion of the drum 1, which may be slightly expanded for the purpose, is the fluid and sediment chamber 8, which is supplied with a water-glass or gage-tube 9. Tapped into or otherwise attached to the bottom of this chamber is a valve-chamber 10, of any suitable construction, in which is arranged a balanced valve 12, carried by a stem 13, which rises into the chamber 8. Upon the valve-stem is mounted a float 14, of suitable size and form, by which the balanced valve may be unseated as the fluid rises in the chamber 8. The lower part of the valve-chamber 10 opens into a pipe 15, which may, if desired, be provided with a suitable cock. As the live steam enters by way of the pipe 3^a, it is compelled to flow downward over the surfaces of the baffle-plates 4, whereby any condensations of vapor or particles of oil or grease carried by it are deposited and caused to adhere to said plates, whence the fluid trickles downward and falls into the chamber 8, while the dry and pure steam enters the mouth of the conveyer 6 and passes to the engine. As the fluid accumulates in the chamber 8, the float is raised and a portion is discharged until the float falls sufficiently to seat the valve. If sediment accumulates in the chamber, the steam-pressure will ordinarily blow it out through the discharge-pipe.

I may substitute the modified construction shown in Fig. 4 in place of that described. In this form of trap the interior of the drum is provided with a partition or plate 16, which is arranged a little to one side of the center, as shown in Fig. 5, where it forms the vertical conveyer 17 for the steam. The baffle-plates 4 extend alternately from the plate or partition 16 and the opposite wall of the drum. It will be seen that this construction is in principle and operation the same as that already described.

In the bottom of the drum is arranged a balanced valve 18, mounted on a pivot 19, and having a stem 13 extending from the out-

let 21, in which the valve is pivoted, into the lower part of the drum. On the stem is mounted the float 14. A separate blow-off pipe 23 is arranged in the bottom of the drum and provided with a cock of any suitable form. A water-glass is attached to the drum in the same manner as in the construction described. In this modified form the steam enters, as before, through the inlet-pipe 3ª and flows downward over the baffle-plates until it reaches the mouth of the conveyer or passage 17. Passing up through the latter it enters the pipe 5 and is conveyed to the engine.

What I claim is—

1. A steam-purifier consisting of a vertically-arranged closed drum having at its upper end a steam-inlet and a steam-outlet and at its lower end a valved water-discharge, a series of inclined baffle-plates alternately projecting past each other from opposite side portions of the drum and forming a zigzag steam-passage, a vertical steam-conveyer opening at its bottom beneath the lowermost baffle-plate and at its upper end connected with the steam-outlet, and a float sustained by the water in the base of the drum and connected with the valve in the water-discharge, substantially as described.

2. A steam-purifier consisting of a vertically-arranged tight drum having at its upper end a steam-inlet and a steam-outlet, a series of inclined baffle-plates alternately projecting past each other from opposite sides of the drum and each having an orifice, and a steam-conveyer tube extending vertically through the orifices in the baffle-plates, opening at its lower end beneath the lowermost plate and having its upper end connected with the steam-outlet, substantially as described.

3. A steam-purifier consisting of an upright drum having at its top a steam-inlet and a steam-outlet and at its bottom a valved water-discharge and blow-off, a series of baffle-plates alternately projecting past each other from opposite sides of the drum and each having an orifice, a vertical steam-conveyer tube extending through the orifices in the baffle-plates and connected with the steam-outlet, and a float sustained by the water in the base of the drum and connected with the valve, substantially as described.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

WALTER ANDERSON TAYLOR.

Witnesses:
FREDERIC COOK,
JAMES DAVIS.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defendant's Exhibit "F." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "G."

2—390.

UNITED STATES OF AMERICA.
DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the

Letters Patent of

Arthur W. Barker,

Number 927,476, Granted July 13, 1909,

for

Improvement in Natural-Gas Separators.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this twenty-first day of March, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] M. H. COULSTON,
Commissioner of Patents.

2—362.

No. 927476.

THE UNITED STATES OF AMERICA.

To All to Whom These Presents Shall Come:

WHEREAS Arthur W. Barker, of Fort Pierre,

South Dakota, has presented to the Commissioner of Patents, a petition praying for the grant of Letters Patent for an alleged new and useful improvement in Natural-gas Separators, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided, and

WHEREAS upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the law.

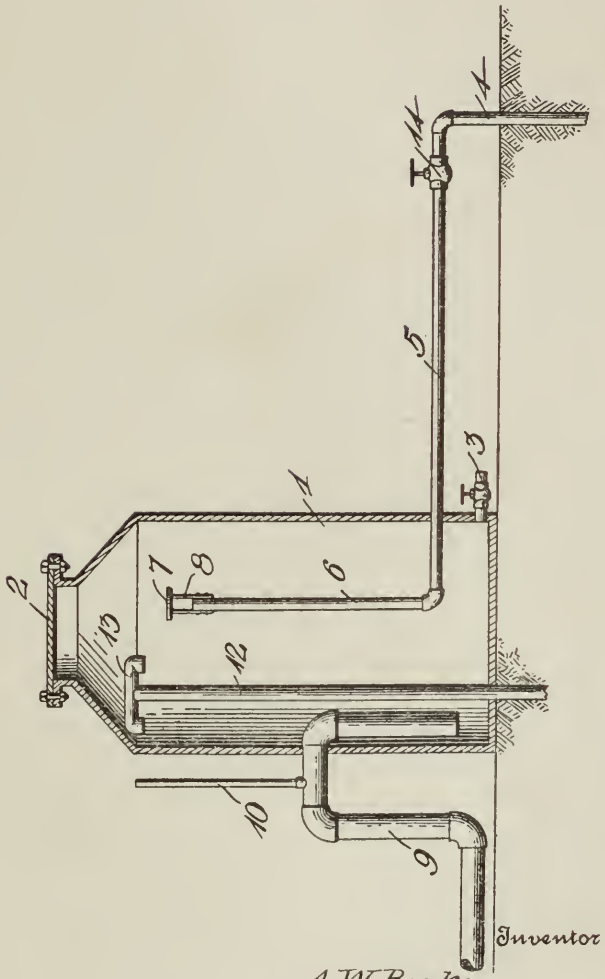
Now therefore these Letters Patent are to grant unto the said Arthur W. Barker, his heirs or assigns for the term of seventeen years from the thirteenth day of July, one thousand nine hundred and nine, the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this thirteenth day of July, in the year of our Lord one thousand nine hundred and nine, and of the Independence of the United States of America the one hundred and thirty-fourth.

[Seal] C. C. BILLINGS,
Acting Commissioner of Patents.

A. W. BARKER.
NATURAL GAS SEPARATOR.
APPLICATION FILED FEB. 9, 1909.

927,476. Patented July 13, 1909.



Witnesses
C. H. Griesbauer

Inventor
A. W. Barker
By H. B. Willson & Co
Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR W BARKER, OF FORT PIERRE, SOUTH DAKOTA

NATURAL-GAS SEPARATOR.

No. 927,476. Specification of Letters Patent. Patented July 13, 1909.

Application filed February 9, 1909 Serial No 477,016.

To all whom it may concern:

Be it known that I, ARTHUR W BARKER, a citizen of the United States, residing at Fort Pierre, in the county of Stanley and State of South Dakota, have invented certain new and useful Improvements in Natural-Gas Separators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in natural gas separators.

The object of the invention is to provide a device of this character by means of which the gas may be entirely separated from the water flowing from Artesian wells thus saving the gas for use as fuel or for lighting purposes, as well as purifying the water to a sufficient extent to be employed for purposes, other than for human use.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, is shown a vertical section of my improved gas separator.

Referring more particularly to the drawings, 1 denotes a tank which may be constructed of concrete, sheet metal or any other suitable material and in any suitable size. The upper end of the tank is closed except for a man-hole formed therein, said man-hole being covered by a suitable closing plate 2. In the lower portion of the tank is arranged a drain pipe 3. The Artesian well pipe 4 is connected to the tank by a pipe 5 which enters the tank near its lower end and is provided within the tank with an upwardly projecting discharge tube 6, on the upper end of which is arranged a sprayer 7 which may be of any suitable construction, but which is here shown as preferably consisting of a flat plate which is secured to and spaced above the upper open end of the tube 6 by supporting rods 8.

Connected with the tank 1 is an over-flow pipe 9, the inner end of which extends downwardly in the tank and opens a short distance above the bottom of the tank, as shown. In the highest portion of the pipe outside of the tank is arranged a vent pipe 10 to prevent siphoning. In the tank is also arranged a gas discharge pipe 12, said pipe being arranged in the tank in any suitable manner so that the open end is at the upper end of the tank The pipe 12 is here shown as extending upwardly through the bottom of the tank to near the upper end thereof and is provided on its upper end with a T head 13, the outer open ends of which are turned downwardly to receive the gas from the upper portion of the tank. The outer end of the gas conducting pipe 12 may be connected with a pipe line or with a storage tank, not shown.

In the operation of the device, the water from the well flows through the pipe 5 and tube 6 and is discharged from the tube 6 against the sprayer 7 which breaks the water up into small particles and separates the gas therefrom. The gas after being thus liberated from the water passes out through the T head 13 and gas conducting pipe 12 to the pipe line or tank from which it is taken for use for fuel or for lighting purposes. The water after thus being broken up, passes out through the overflow pipe and is conveyed thereby to a place of use.

The water conducting pipe from the well 4 is provided with a regulating valve 14, whereby the supply of water to the tank may be controlled. Should the water entering the tank contain more gas than is utilized or can be carried off by the pipe 12, the pressure of the gas thus accumulating in the tank will force the water down below the open end of the discharge pipe and will escape through said pipe thus preventing the bursting of the tank from an overpressure of the gas. As soon as the gas has thus liberated itself through the over-flow pipe, the water will again rise therein and will remain at a level with the upper portion of the over-flow pipe until the gas in the tank again reaches a pressure sufficient to force the water down and out of the over-flow pipe. By this arrangement, the danger of the bursting of the tank from an overpressure of the gas is entirely eliminated.

By means of a separating device such as herein shown and described, all of the gas contained in the water may be separated therefrom and the gas utilized for fuel or lighting purposes, while the water is purified to a sufficient extent to permit the use thereof for many purposes.

Fm the foregoing description, taken in conrction with the accompanying drawingsthe construction and operation of the invetion will be readily understood without reqting a more extended explanation.

Vious changes in the form, proportion andhe minor details of construction may be rsorted to without departing from the prinple or sacrificing any of the advantages of t invention as defined in the appended clais.

Eving thus described my invention, what I clm as new and desire to secure by Letters'atent is:

1 A gas separating device for Artesian well comprising a closed tank, a water oonducng pipe to connect said tank with the wel pipe, a sprayer arranged on the upper end f the water conducting pipe to break the vater discharged therefrom into small parcles and thereby liberate the gas therefro. a gas conducting pipe extending into the ank, a water over-flow pipe connected to te lower portion of the tank, and a vent arranged in said over-flow pipe to prevent the siphoning of the water from the tank.

2 In a gas separating device for Artesian wells, a closed tank, a water conducting pipe to connect said tank to the well pipe, means on the upper end of said water conducting pipe to break up or spray the water discharged therefrom, a regulating valve arranged in said water conducting pipe, a gas conducting pipe extending up through the tank, a T head on the upper end of said pipe, said T head having downwardly projecting open ends to receive the gas from the upper end of the tank, a water discharge pipe arranged in the tank, and extending to near the bottom thereof, and a vent tube arranged in said over-flow or discharge pipe.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR W. BARKER.

Witnesses:
T. R. STRAIN,
MATHILDE GOLDSMITH.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defendant's Exhibit "G." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "H."

2—390.

UNITED STATES OF AMERICA,

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE.

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the

Letters Patent of

Eustace Vivian Bray, Assignor of one-half to Richard S. Haseltine,

Number 1,014,943, Granted January 16, 1912, for

Improvement in Separators for Removing Gas from Oil or Other Liquids.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this twenty-fourth day of March, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] M. H. COULSTON,
Commissioner of Patents.

2—362.

No. 1014943.

THE UNITED STATES OF AMERICA,

To All to Whom These Presents Shall Come:

WHEREAS Eustace Vivian Bray, of Coalinga, California, has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in Separators for Removing Gas from Oil or other Liquids. He having assigned one-half of his right, title, and interest in said improvement to Richard S. Haseltine, of Coalinga, California, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided, and

WHEREAS upon due examination made the said Claimant is adjudged to be justly entitled to a patent under the law.

Now therefore these Letters Patent are to grant unto the said Eustace Vivian Bray and Richard S. Haseltine, their heirs or assigns for the term of seventeen years from the sixteenth day of January, one thousand nine hundred and twelve, the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this sixteenth

day of January, in the year of our Lord one thousand nine hundred and twelve, and of the Independence of the United States of America the one hundred and thirty-sixth.

[Seal] C. C. BILLINGS,
Acting Commissioner of Patents.

E. V. BRAY.

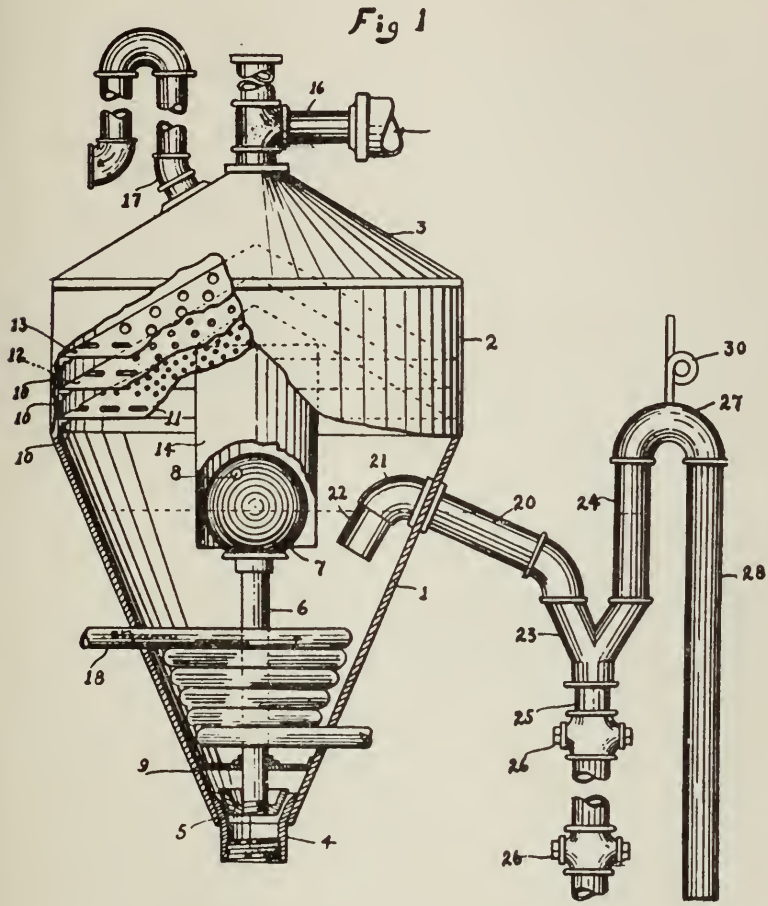
SEPARATOR FOR REMOVING GAS FROM OIL OR OTHER LIQUIDS.

APPLICATION FILED MAR. 25, 1911.

1,014,943. Patented Jan. 16, 1912.

3 SHEETS—SHEET 1.

Fig 1



WITNESSES

H. B. Clark,

B. M. Freund

INVENTOR

E. V. Bray

BY

Carlos P. Griffin

ATTORNEY

E. V. BRAY.

SEPARATOR FOR REMOVING GAS FROM OIL OR OTHER LIQUIDS.

APPLICATION FILED MAR. 25, 1911.

1,014,943. Patented Jan. 16, 1912.

2 SHEETS—SHEET 1.

Fig 2

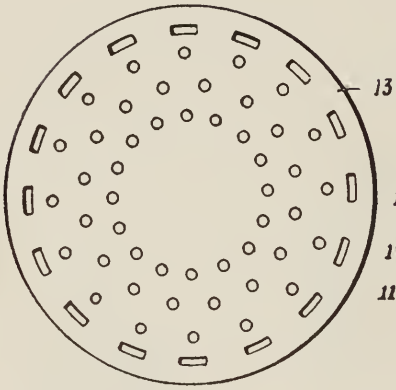


Fig 3

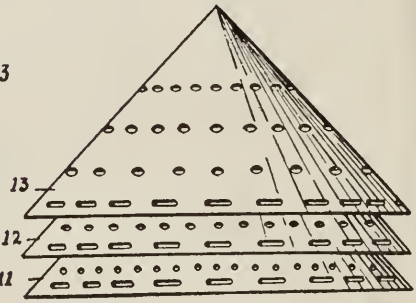
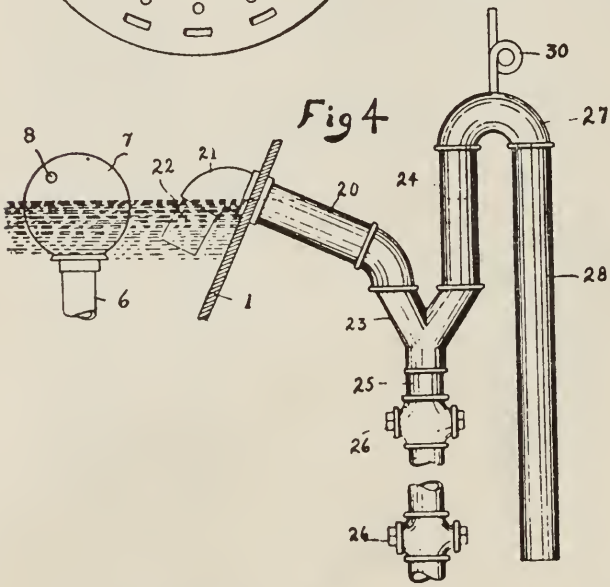


Fig 4



WITNESSES

H B Clark.

B. M. Freund

INVENTOR

E. V. Bray

BY

Carlos P. Griffin

ATTORNEY

UNITED STATES PATENT OFFICE.

JS'ACE VIVIAN BRAY, OF COALINGA, CALIFORNIA, ASSIGNOR OF ONE-HALF TO RICHARD S. HASELTINE, OF COALINGA, CALIFORNIA.

SEPARATOR FOR REMOVING GAS FROM OIL OR OTHER LIQUIDS.

01,943. Specification of Letters Patent. **Patented Jan. 16, 1912.**

Application filed March 25, 1911. Serial No. 616,975.

'all whom it may concern:

e it known that I, EUSTACE V. BRAY, en of the United States, residing at inga, in the county of Fresno and State 'alifornia, have invented a new and use- Separator for Removing Gas from Oil ther Liquids, of which the following is ecification in such full and clear terms vill enable those skilled in the art to con- ct and use the same.

his invention relates to an apparatus for purpose of the removal and the collec- of gas from crude oil or other liquid.

will be understood by those skilled in art that crude oil and other liquids as come from the ground and some other ds, contain considerable quantities of bustible gas. This gas is ordinarily per- ed to escape and waste. However, the ntity of gas in some oils and liquids is considerable as to make this a serious te, and to prevent this waste, this appa- s has been designed. After the gas is rated from the oil or other liquids and been collected, it may be burned under boiler supplying steam to an oil pump l in a gas engine or for heating and ting, or it may be used at any other able place where power is desired, thus cting a considerable economy in power.

n the drawings in which the same nu- al of reference is applied to the same tion throughout the several views, Fig- 1 is a view partly in section of the gas rator, Fig. 2 is a plain view of the top rating screen, Fig. 3 is a side elevation the three separating screens used, and . 4 is a view illustrating the overflow e.

The numeral 1 represents a conical cas- having a cylindrical extension 2, the of which is closed by means of the cy- lrical cone 3. At the bottom of the cone here is a sleeve 4, within which a valve stopper 5 seats. The valve 5 is screwed the lower end of a pipe 6, to which pipe secured a float 7, the latter having an ning 8 therein for a purpose to be ex- ined. Near the bottom of the casing 1, e is a guide plate 9 to prevent the valve m working out of line with the sleeve 4. he cylindrical casing 2 is provided with eries of brackets 10, there being a num- of said brackets at different levels to pport the three screens 11, 12 and 13, the latter screen having larger openings therein than the lower screen. The lowest screen has a cylindrical casing 14 secured thereto, which extends downwardly over the float 7, the object being to prevent the incoming oil or liquid from flowing down over the top of the float and accumulating sand and foreign matter thereon, thus preventing its free action.

The oil or liquid is fed into the casing through the pipe 16 at the top of the cone 3, and the gas is removed therefrom through the pipe 17 at the side of the pipe 16. Since heavy fuel oil is more or less viscous, it becomes necessary to provide means to heat the same, a better separation of the gas being effected when the oil is hot. The steam coil also by its heat can cause possibly a greater liberation of gas. This means comprises a coil of pipe 18 at the bottom of the cone 1. In operation the oil or liquid is forced into the apparatus through the pipe 16, one of the openings in said pipe being closed, or both receiving oil or liquid from different sources of supply. The oil or liquid then passes down over the screens and into the cone 1, filling the latter until the float 7 lifts the valve 5 enough to permit such a quantity of oil or liquid to escape as will again seat the valve, or it may be that the valve will be open continuously. However, since the only escape for the gas is through the pipe 17, it may be collected in a suitable receptacle, or may be run to a furnace to be burned, or used in some metallurgical or chemical process, or in the arts.

In order to insure against oil or liquid leaking into the float and interfering with the operation thereof, the pipe 6 is opened to the oil drain pipe, thus permitting the escape of any oil should the float leak, or should the casing 1 be unduly filled, the oil or liquid might run through the opening 8 to the main pipe line.

Since considerable sand or other foreign matter is usually brought along with the oil or liquid, it becomes necessary to provide some means for insuring the continuous operation of the separator should the sand or foreign matter become so great in quantity as to close up the valve 5 and prevent the escape of oil therefrom. This means comprises a pipe 20 connected to the cone 1 and having a downwardly extending elbow 21 and short nipple 22. This pipe

2—362.

No. 815,407

THE UNITED STATES OF AMERICA,

To All to Whom These Presents Shall Come:

WHEREAS Augustus Steiger Cooper of Berkeley, California, has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in Separators for Gas, Oil, Water and Sand, a description of which invention is contained in the specification of which a copy is hereto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and

WHEREAS upon due examination made the said claimant is adjudged to be justly entitled to a patent under the law;

NOW THEREFORE THESE LETTERS PATENT are to grant unto the said Augustus Steiger Cooper, his heirs or assigns for the term of seventeen years from the twentieth day of March, one thousand nine hundred and six, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington this twentieth day of March, in the year of our Lord one thousand nine hundred and six and of the Independence of the United States of America the one hundred and thirtieth.

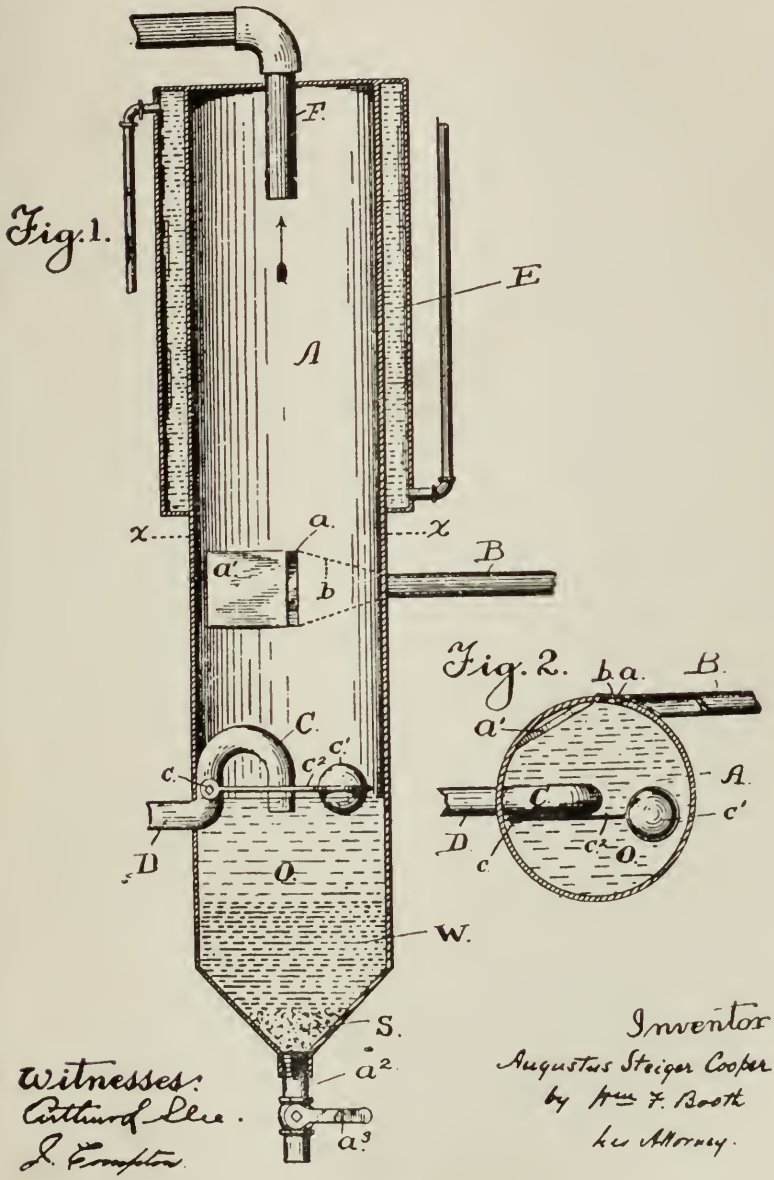
[Seal] F. I. ALLEN,
Commissioner of Patents.

No. 815,407. PATENTED MAR. 20, 1906.

A. S. COOPER.

SEPARATOR FOR GAS, OIL, WATER, AND SAND.

APPLICATION FILED JUNE 14, 1905.



UNITED STATES PATENT OFFICE.

AUGUSTUS STEIGER COOPER, OF BERKELEY, CALIFORNIA.

SEPARATOR FOR GAS, OIL, WATER, AND SAND.

No. 815,407. Specification of Letters Patent. Patented March 20, 1906.

Application filed June 14, 1905. Serial No. 265,148.

To all whom it may concern

Be it known that I, AUGUSTUS STEIGER COOPER, a citizen of the United States, residing at Berkeley, county of Alameda, State of California, have invented certain new and useful Improvements in Separators for Gas, Oil, Water, and Sand; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of separators used in connection with gas and oil wells by which a separation is effected of the several constituents of the contents issuing from well-pipe. In that process which I set forth in a contemporaneous application for a patent a portion of the gas from the well is used repeatedly as a lift or pulverizer to relieve the well of oil and water by raising or assisting to raise them. The contents of the discharge-pipe, composed of gas, oil, water, sand, and silt, is forced into a vessel included in the pressure system, wherein the constituents are separated without affecting the general pressure in the system and the gas recovered and taken to the compressor to be used again in part as the lift or pulverizer to relieve the well, the surplus of the gas being conducted away for any useful purpose.

It is to such a separator that my invention relates, its object being to efficiently separate and deliver the gas, oil, water, and sand from a pressure system used in lifting or pulverizing the oil and water and relieving the well of them.

To this end my invention consists in the novel separator which I shall now describe by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the separator. Fig. 2 is a cross-section on the line $x\ x$ of Fig. 1.

A is a cylinder of suitable capacity. In one side is made an inlet-opening a, leading through the wall at an angle, whereby the discharge end b of the pipe B from the well is adapted to deliver the pipe contents into the cylinder tangentially to its circumference. A steel wearing-plate a' is fixed to the inner wall of the cylinder to receive the material. The lower end of the cylinder has an outlet a^2, with a controlling-cock a^3.

From the cylinder at a predetermined level above its bottom issues a pipe C, which connects with the pipe D, which leads to the oil-tank. The pipe C has a cock c, which is operated automatically by the float c', connected with it by an arm c^3. Around the upper portion of the cylinder is a water-jacket E, and from the top of the cylinder leads the gas-pipe F to the compressor.

The operation is as follows: Gas, oil, water, silt, and sand are forced from near the bottom of the well by the compressed gas and pass through the pipe B into the cylinder A. Entering the cylinder under pressure tangentially to its circumference, the material is thereby given a rotary motion, which separates the constituents conformably to their specific gravities. The gas rises and passes from the cylinder through pipe F to the compressor. The sand seeks the outer circle and drops down to the bottom, as is indicated by S. The water W lies on the sand, while the oil O lies on the water. When these constituents accumulate to raise the oil to a certain level, the float c' rises and opens the cock c, thereby permitting the oil to be forced out by the internal pressure in the system through the pipe C to the oil-tank. When enough oil has been forced out to lower the level, the cock c is automatically closed by the descent of the float. When the cock a^3 is opened, the sand and water may be blown off through the outlet a^2. A high pressure of gas may thus be maintained in this cylinder. The water-jacket cools the gas before it is used in the compressor.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A separator for gas, oil, water and sand, comprising a cylinder, a means for delivering the material into its side tangentially to its circumference, to impart a rotary motion to said material, whereby its constituents are separated, an exit for the gas at the top of the cylinder, an exit for the sand and water at the bottom of the cylinder, and an intervening exit for the oil automatically controllable by the level of said oil.

2. A separator for gas, oil, water and sand, comprising a vessel, means for imparting to the material fed to it a rotary motion to separate its constituents according to their specific gravities, an exit for the gas at the top of the cylinder, an exit for the sand and water at the bottom of the cylinder, and an intervening exit for the oil, automatically controllable by the level of said oil.

3. A separator for gas, oil, water and sand, comprising a vessel, means for imparting to the material fed to it a rotary motion to separate its constituents according to their specific gravities, an exit at the top for the gas,

815,407

exit at the bottom for the sand and water, intervening exit for the oil, a cock controlling said last-named exit, and a float connected with the cock to open and close it according to the level of the oil.

4. A separator for gas, oil, water and sand, comprising a cylinder, a means for delivering the material into its side tangentially to its circumference, to impart a rotary motion to said material, whereby its constituents are separated, an exit for the gas at the top of the cylinder, an exit for the sand and water at the bottom of the cylinder, and an intervening exit for the oil, automatically controllable by the level of said oil, by means of a cock operated by a float in said liquid constituent.

In witness whereof I have hereunto set my hand.

AUGUSTUS STEIGER COOPER.

Witnesses:
J. COMPTON,
D. B. RICHARDS.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defts. Exhibit "I." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 16, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "J."

2—390.

UNITED STATES OF AMERICA,

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE.

To All to Whom These Presents Shall Come, GREETING:

THIS IS TO CERTIFY that the annexed is a true copy from the Records of this Office of the

Letters Patent of

Albert T. Newman, Assignor of one-half to Ernest McClure,

Number 856,088, Granted June 4, 1907,

for

Improvement in Water and Gas Separators.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed in the District of Columbia this third day of May, in the year of our Lord one thousand nine hundred and twenty-one and of the Independence of the United States of America the one hundred and forty-fifth.

[Seal] T. E. ROBERTSON,
Commissioner of Patents.

2—362.

No. 856,088.

THE UNITED STATES OF AMERICA,

To All to Whom These Presents Shall Come:

WHEREAS Albert T. Newman of Greeley, Kansas, has presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in

Water and Gas Separators,

He having assigned one-half of his right, title and interest, in said improvement, to Ernest McClure, of Greeley, Kansas, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and

WHEREAS upon due examination made the said claimant is adjudged to be justly entitled to a patent under the law;

NOW THEREFORE THESE LETTERS PATENT are to grant unto the said Albert T. Newman and Ernest McClure, their heirs or assigns for the term of seventeen years from the fourth day of June, one thousand nine hundred and seven, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office

to be affixed, at the City of Washington, this fourth day of June, in the year of our Lord one thousand nine hundred and seven and of the Independence of the United States of America the one hundred and thirty-first.

[Seal] E. B. MOORE,
Commissioner of Patents.

No. 856,088. PATENTED JUNE 4, 1907.

A. T. NEWMAN.

WATER AND GAS SEPARATOR.

APPLICATION FILED AUG. 28, 1906.

2 SHEETS—SHEET 1.

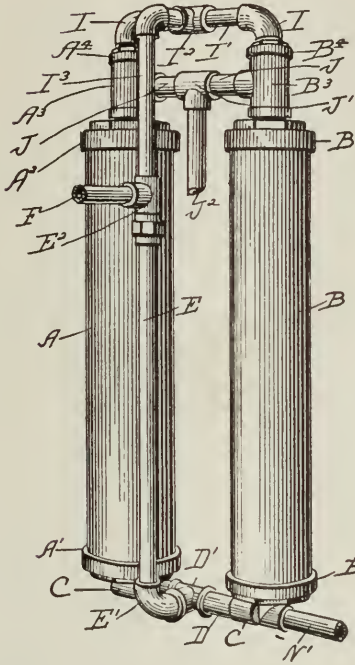


Fig. 1.

Fig. 3.

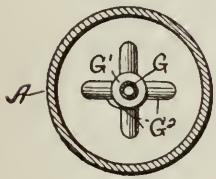


Fig. 4.

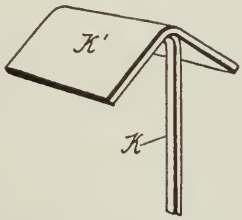
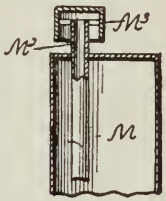


Fig. 5.



WITNESSES

M. D. Blandel,

Ira D. Wright.

INVENTOR

A. T. Newman,

By O'Meara & Brock,

ATTYS.

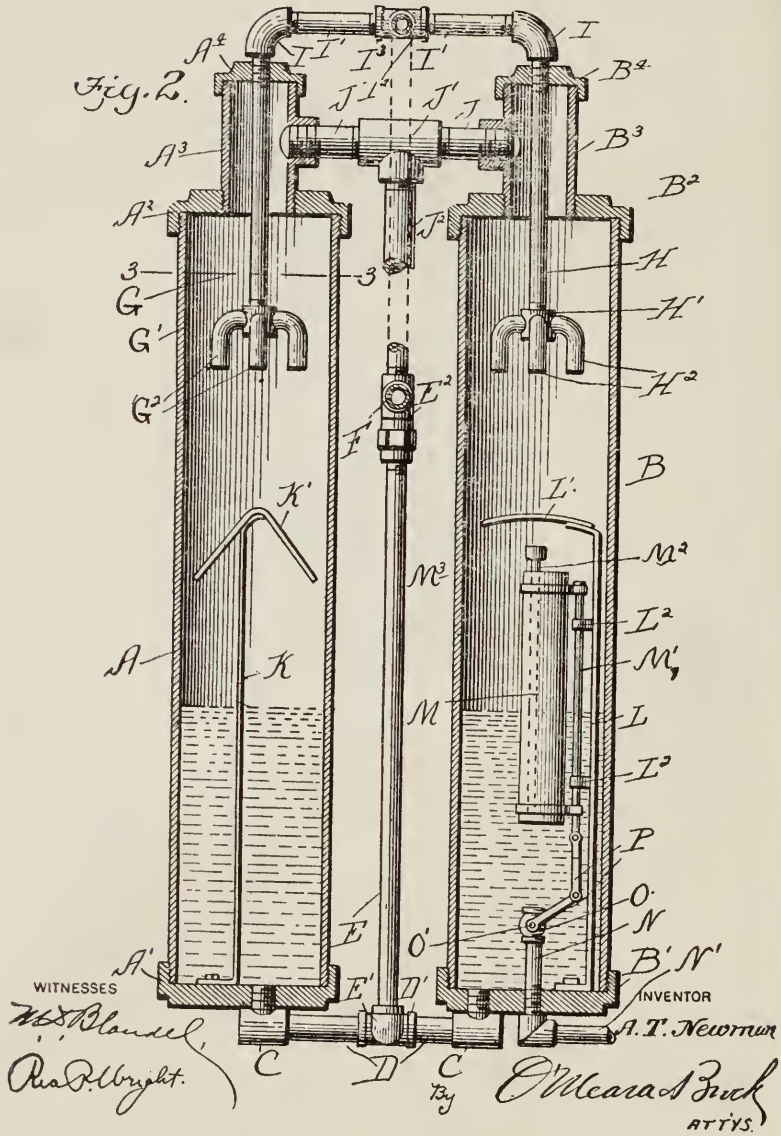
No. 856,088. PATENTED JUNE 4, 1907.

A. T. NEWMAN.

WATER AND GAS SEPARATOR.

APPLICATION FILED AUG. 28, 1906.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

BERT T. NEWMAN, OF GREELEY, KANSAS, ASSIGNOR OF ONE-HALF TO ERNEST McCLURE, OF GREELEY, KANSAS.

WATER AND GAS SEPARATOR.

85088. Specification of Letters Patent. Patented June 4, 1907.

Application filed August 28, 1906. Serial No. 332,366.

all whom it may concern:

Be known that I, ALBERT T. NEWMAN, a zen of the United States, residing at Greeley in the county of Anderson, in the State Kansas, have invented a new and useful prov ment in Water and Gas Separators, whh the following is a specification.

This invention relates to certain new and ful improvements upon my patent issued emer 6, 1904, No. 776,753, the object ng to distribute the force of gas, especially hig pressure so as to eliminate the spray l ve the water chance to collect and tle to the bottom of the tank, and allow separation to be made more perfectly.

Wit this and various other objects in w, he invention consists in the novel fea- es f construction, hereinafter fully de- ibe and pointed out in the claims.

In he drawings forming a part of this cifition:—Figure 1 is a perspective w f my improved water and gas separa- . ig. 2 is an enlarged vertical sectional w f the separator. Fig. 3 is a trans- sectional view taken on the lines 3—3 Fi. 2. Fig. 4 is a perspective view of o the hoods. Fig. 5 is a detail sectional w f the float.

Referring to the drawings A and B indi- e pair of tanks provided with threaded ls n which are secured caps A′, A², and B The caps A′, B′ are provided with ead openings in which the threaded m f the T-joints C are secured which are ure on the end of the pipe sections D ovid with a T-coupling D′, extending t rizontally and to which an elbow E′, sered carrying a pipe E provided with a couling E², to which an inlet pipe F is ne.ed. The caps A², B² are provided th hreaded openings in which the lower read ends of the pipe sections A³, B³ are ure which are provided with caps A⁴, B⁴, t upper ends provided with threaded enings through which the threaded ends th pipes G and H project, which extend wn into the tanks and are provided with ads G′, H′ carrying downwardly project- g arved distributing pipes G², H². Se- red to the upper threaded ends of the pes G and H, are elbows I provided with pe sections I′, carrying a T-coupling I², ovied with a pipe I³, connected at its herend to the T-coupling E².

The pipe sections A³, B³, are provided with threaded openings in its side in which are secured pipe sections J, carrying a T-coupling J′, in which an outlet pipe J², is secured. Brackets K and L are secured in the tanks A and B, provided with hoods K′, L′ at their upper ends forming reflectors, the hood K being formed inverted V-shaped in cross-section. Secured to the bracket L are apertured lugs L², in which is mounted a rod M′, carrying a hollow float M, which is provided with a tube M², extending out from the top provided with a cap M³, at its upper end which prevents the same from being filled with water and at the same time to allow the gas to enter the float, thereby equalizing the pressure. Projecting up through a threaded opening in the cap B′, of the tank B is a pipe N provided with a valve O, at its upper end, the stem O′ of which is connected to the bar M′ by links P. The other end of the pipe N is connected to a discharge pipe N′.

The operation of the device is as follows:—The gas is led from the well by the pipe F, into the top and bottom of the tanks A and B through the pipes I³, and E thereby dividing the force of the gas into the tank keeping the agitation in the bottom of the tanks preventing the dirt from settling and blocking up the pipes, and the gas entering the top of the tanks through the pipes G and H, is divided again by the distributers G², H², and strikes the hoods K′, L′ preventing the gas from boiling up the water accumulated in the bottom of the tank thus preventing much spray and protects the float M from incoming rush of gas, and as the gas rises, it will pass out the outlet pipe J². As the water rises in the tank, it will carry the float with it, which will gradually open the valve O allowing a portion of the water to escape out the discharge pipe N and as the float falls, the valve will close gradually.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a pair of tanks connected together by pipes at their top and bottom, of an inlet pipe connected to said pipes, outlet pipes connected to said tanks and a discharge pipe connected to one of said tanks, for the purpose described.

2. The combination with a pair of tanks, of inlet pipes connected to the top and bot-

tom of said tanks, and an outlet pipe connected to the top of said tanks.

3. The combination with a pair of tanks, of inlet pipes connected to the top and bottom of said tanks, outlet pipes connected to the top of said tanks, a discharge pipe secured in the bottom of one of said tanks provided with a valve and a float connected to said valve, for the purpose described.

4. The combination with a pair of tanks, of pipes connecting the top and bottom of said tank, an inlet pipe connected to said pipes, outlet pipes connected to said tanks, and a discharge pipe provided with a valve arranged in one of said tanks, for the purpose described.

5. The combination with a pair of tanks, connected together at their lower ends, of pipes extending down into said tanks provided with distributers, pipes connected to said pipes and the connecting pipes, an inlet pipe connected to said pipes, and outlet pipes connected to said tanks, for the purpose described.

6. In a device of the kind described, the combination with a pair of tanks, of inlet pipes connected to the top and bottom of said tanks, reflectors arranged in said tanks, outlet pipes connected to said tanks, and a valve controlled discharge pipe, connected to one of said tanks, for the purpose described.

7. In a device of the kind described, the combination with a pair of tanks, of inlet pipes connected to said tanks at their top and bottom, distributers connected to the upper inlet pipes, and reflectors arranged under said distributers, for the purpose described.

8. In a device of the kind described, the combination with a pair of tanks, of inlet pipes connected to the top and bottom of said tanks, distributers connected to the upper inlet pipes in said tanks, reflectors arranged in said tanks under said distributers, outlet pipes connected to said tanks, and a discharge pipe connected to one of said tanks provided with a float operated valve, for the purpose described.

9. In a device of the kind described, the combination with a pair of tanks, provided with reduced upper portions, of inlet pipes connected to the bottom of said tanks, inlet pipes connected to said reduced portion having distributers on their ends, outlet pipes connected to the reduced portion, reflectors arranged in said tanks under said distributers, a discharge pipe connected to one of said tanks, provided with a valve, and a float connected to said valve, for the purpose set forth.

10. In a device of the kind described, the combination with a pair of tanks provided with reduced upper portions, of pipes connecting the lower ends of said tanks, pipes extending down into said tank through the tops of the reduced portions, and inlet pipes connected to said pipes and to the pipes connecting the lower end of the tanks, outlet pipes connected to the reduced portion of said tanks, and a valve controlled discharge-pipe connected to one of said tanks, for the purpose described.

11. In a device of the kind described, the combination with a pair of tanks of inlet pipes connected to the top and bottom of said tanks, outlet pipes connected to the top of the said tanks, a discharge pipe extending up into one of said tanks, provided with a valve, and a float slidably mounted in said tank connected to the stem of said valve by links, for the purpose described.

12. In a device of the kind described, the combination with a pair of tanks, of inlet pipes connected to the top and bottom of said tanks, distributers connected to the upper inlet pipes, brackets mounted in said tanks provided with deflectors, apertured lugs secured to one of said brackets, a rod slidably mounted in said lugs carrying a float, a valve controlled discharge pipe connected to said tank and links connecting the stem of said valve to said rod for the purpose described.

13. In a device of the kind described, the combination with a pair of tanks, of inlet pipes connected to the top and bottom of said tanks, distributers connected to the upper inlet pipes, brackets carrying deflectors arranged under said distributers in said tanks, outlet pipes connected to said tanks, a discharge pipe connected to one of said tanks provided with a valve, a float slidably mounted on one of said brackets and links connecting said float to the stem of the valve of the discharge pipe, for the purpose described.

A. T. NEWMAN.

Witnesses:

CHAS. H. LYON,

W. C. LYON.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defts. Exhibit "J." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defts Ex 3 K

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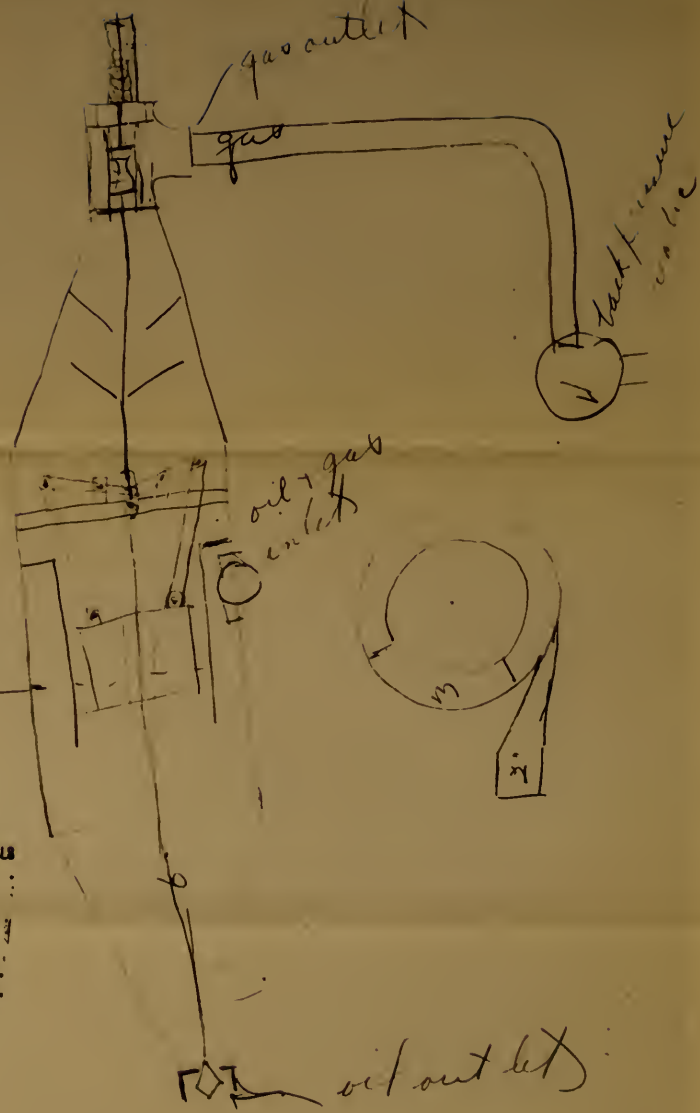
Townsend, et al
v.
Lorraine

Defts' Ex. K

Filed Mch. 27-1922
Chas. N. Williams
Clerk



No. 3945
UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE NINTH CIRCUIT
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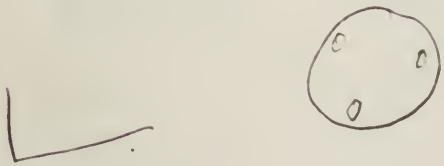

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ed March 27, 1922
Chas. N. Williams
Clerk

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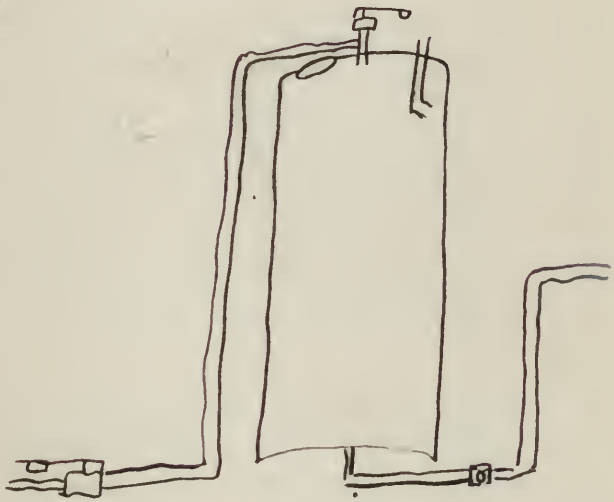
MONCKTON.
CLERK.



Defendants' Exhibit "N."

TRUMBLE GAS TRAP CO.

916 Higgins Building,

Los Angeles, Cal.

June 14, 1921.

Mr. William Lacy,
601 Washington Building,
Los Angeles,
Cal.

Dear Sir:

Referring to the correspondence had with you during the month of December, 1920, relative to the matter of the Lorraine Infringement of the Trumble Gas Trap Patents, I wish to say that I note in yours of December 13th, your statement that you would cease making the Lorraine Gas Trap until he (Mr. Lorraine) produced the proper evidence that he is not infringing upon our patent rights.

We have heard nothing direct from you since that date, but are informed that almost immediately after the receipt of this letter in which you stated that only one Trap had been delivered to Mr. Lorraine, that five additional Traps were sold and placed in the field. We are now informed that you are manufacturing twenty-five of these Traps in your factory here in Los Angeles, and that they will be delivered to Mr. Lorraine for marketing just as soon as it is possible for you to complete them.

It seems that we must presume that you have now elected to become a party to the infringement

by Mr. Lorraine, and have deemed it unnecessary to inform us that you were intending to continue such infringement. With this in mind we now find ourselves compelled to look upon you as a most wilful infringer of the Trumble Patent, and as such we think it nothing more than right that The Lacy Manufacturing Company should be made a party to the Infringement Suit now pending against Mr. Lorraine.

2.

Mr. William Lacy,
Los Angeles, Cal. June 14, 1921.

We have noticed that all of the Lorraine Traps so far put into use, are marked with the LACY MANUFACTURING COMPANY plate showing your Company is responsible for their manufacture.

The writer regrets very much the necessity for us to resort to suit for protection against your Company's arbitrary seizing of the rights which we consider are the legal property of Mr. Trumble and his associates.

We shall await a few days in order that you may reply if you so see fit, as we desire to be courteous in the matter.

We are,

Yours very truly,
F. M. TOWNSEND.

FMT. WW.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defts. Exhibit "N." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "O."

LACY MANUFACTURING CO.

Plate and Sheet Steel Workers.

Steel Oil Storage Tanks and Riveted Steel Pipe.

Office 601 Washington Building,

Third and Spring Streets.

Phones Main 196.
Home A 3250.

WORKS: Cor. N. Main & Date Streets.

Los Angeles, Cal.

All Agreements are Contingent Upon Strikes, Accidents, Delays of Carriers, and Other Delays Unavoidable or Beyond Our Control. Quotations Subject to Change Without Notice.

Los Angeles, June 15, 1921.

Mr. F. M. Townsend,
916 Higgins Bldg.,
City.

Dear Sir:

I am in receipt of yours of the 14th inst., in which you refer to my letter to you of December 13, 1920 wherein I made the statement that the Lacy Manufacturing Company would cease making the Lorraine Gas Trap until Mr. Lorraine produced the proper evidence that he is not infringing on your

patent rights, and I now beg to inform you that immediately after sending my letter of December 13th, in order to satisfy myself as to your claim that the Lorraine Trap was an infringement of the Trumble Gas Trap patents, I secured the opinion of several able patent attorneys in regard to your claim of infringement and their opinion was absolutely contrary to your contention. After securing these opinions we were satisfied that Lorraine's patent did not in any way conflict with the Trumble patent and we then concluded to fill the orders that Mr. Lorraine had placed with us.

As stated to you before, our policy in the past, as it will be in the future, has been never to infringe upon the legal rights of others, but we are in the business of manufacturing articles of this class and cannot recognize the demands of any one that we cease taking such orders.

The traps that we have made for Mr. Lorraine do not in any way infringe on the Trumble patent and we believe that we shall continue to make them for him as long as he is able to pay for them.

Yours very truly,

LACY MANUFACTURING COMPANY.

WM. LACY.

WL: HH.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defts. Exhibit "O." Filed March 27, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.

Defendants' Exhibit "P."

Patents Trademarks Copyrights Corporations

DR W P KEENE

Attorney and Counsellor in Patent Causes

929 W. P. Story Building

Los Angeles, California

Telephones:

Broadway 1487.

Residence 20730.

December 29, 1920.

Lacy Manufacturing Co.,

601 Washington Building,

Los Angeles, California.

Gentlemen:

Agreeable to your request, I have carefully examined the patent issued to Mr. M. J. Trumble, for Crude Petroleum and Natural Gas Separator, application filed November 14, 1914, numbered 1,269,134, Patented June 11, 1918, and the drawings of the new gas trap invented by Mr. D. G. Lorraine of Los Angeles, California, and I find that there is no infringement of the Trumble patent by the apparatus invented and designed by Mr. Lorraine.

There might exist some doubt as to the third and broadest claim of Trumble, which claims "an expansion chamber having a surface adapted to sustain a flow of oil thereover in a thin body," but this is limited by "pressure maintaining means arranged and adapted to maintain a pressure on one side of the flowing oil."

This pressure maintaining means seems to be only supported in the Trumble patent by the ordinary oil well pump—and it is not understood how the pressure can be maintained on one side of a film of oil,—and as the baffle plate or other spreading means of Lorraine's does not form a thin film and no pressure can normally exist in Lorraine's trap on one side of the flowing oil, this claim is not infringed.

This, as well as the other limited and narrow claims of Trumble, will no doubt have to be interpreted by some court action and judicial authority, before they can be properly construed, and Trumble distinctly shows and describes a velocity reducing means which would reduce pressure.

However, the close proximity of the margin of the first cone to the walls of the chamber might cause a back pressure, but would also interfere with a film on the surface thereof as claimed.

Also, Lorraine merely breaks up the direct flow of his oil stream by striking an inclined baffle plate, the margins being so distant from the sides of the chamber as not to form a film on the walls and a large portion of the baffle being normally immersed in oil and only extending over a small portion of

the total area of the chamber, thus preventing a one-sided pressure as claimed by Trumble.

As to the substitution by Lorraine of other deflecting discharge to break up the flow of oil instead of the baffle plate, all doubt is eliminated as there

vill be no surface capable of "sustaining a film f oil."

Respectfully,
W. P. KEENE.

[Endorsed]: E—113—Eq. Townsend et al. vs. Lorraine. Defendants' Exhibit "P." Filed March 7, 1922. Chas. N. Williams, Clerk.

No. 3945. United States Circuit Court of Appeals for the Ninth Circuit. Filed Jan. 26, 1923. F. D. Monckton, Clerk.